December 16, 1935

STEEL

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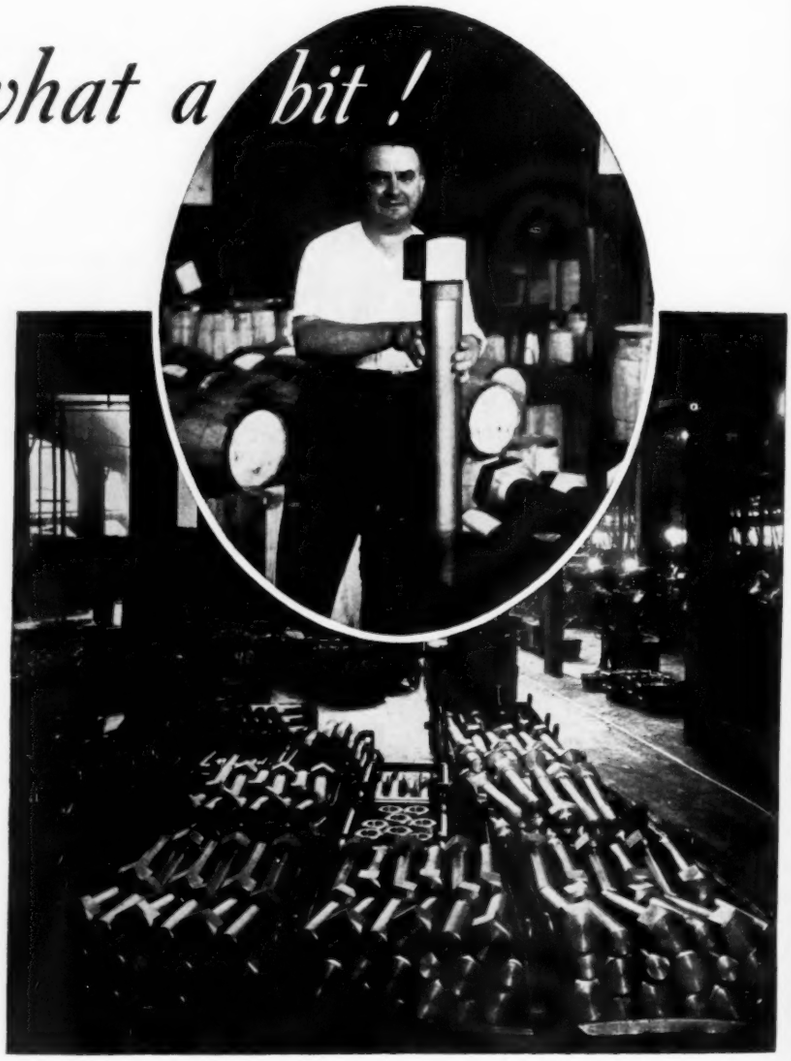

When Uncle Sam does things, he does them right—that's why these vital parts for the emergency gates and needle valves of this big dam were made of Republic Alloy Steels—and many of them of ENDURO, Republic's Perfected Stainless Steel.

These items varied in size from tiny pieces weighing one-seventh of an ounce to huge studs and bolts that a man can barely lift. Specifications were most rigid. Every single piece, and there were hundreds of them, had to be perfect to satisfy the engineers who inspected before shipment.

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Republic Steel
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GENERAL OFFICES · · · YOUNGSTOWN, OHIO
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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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Sinbad's Burden

. . . Yielding to the pleadings of the Old Man of the Sea, Sinbad lifted him onto his shoulders and carried him tenderly across the stream. To his amazement, the Old Man refused to alight. Instead, he entwined his legs so tightly around Sinbad's chest that he could not be shaken off. Day after day Sinbad's burden became more and more crushing. . . .

A MATERIAL, process or modus operandi will sometimes so firmly imbed itself in the construction of an implement, appliance, engine, machine, vehicle, or part, that discarding it in favor of something more modern is often difficult. Meantime, its continued use may become a serious burden to both production and sales departments. . . . For competition is ever ready to capitalize a rival's lack of progressiveness.

Is the persistent retention of once modern steels threatening to leave your company behind in the face of the newer discoveries of metallurgists and steel-makers? Have you brought yourself up to date on the latest progress of Molybdenum—the alloy which not only improves ordinary carbon steel, but actually increases the effectiveness of other alloys?

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Investigate Moly. Moly has had more than a decade of countless laboratory, steel-furnace, foundry, forge and punishing service tests. We invite engineers, metallurgists, production and business executives to write for either or both of these interesting books: "Molybdenum in 1934" and "Molybdenum in Cast Iron—1934 Supplement." Also ask us to mail you our periodical news-sheet, "The Moly Matrix." Be free, too, to enlist the aid of our Detroit experimental laboratory. Climax Molybdenum Company, 500 Fifth Avenue, New York.

MOLY

CLIMAX Mo-lyb-den-um

INDUSTRY'S MOST MODERN AND VERSATILE ALLOY

As the Editor Views the News

ANYONE who reads the signs in the iron, steel and metalworking industries must realize that the race for 1936 business is going to be exceedingly keen. Many producers, fabricators and manufacturers are working feverishly to put plant, equipment, organization and personnel into the best possible condition. This suggests not only that competition will be intensified, but also that the methods employed in competition will be more diversified. Inevitably some sellers will continue to use the pencil type of price cutting, but an increasing number will depend more upon low prices achieved through efficency and upon the effective weapons of quality and service.

• • •

Selling on Size vs. Service

The apathy of certain companies to the potency of quality and service in winning business prompts a contributor to STEEL (p. 15) to utter a warning to sellers who think that the size or prestige of a company is a valid sales argument. He contends that many small companies are "running rings around" some of their larger competitors due to their ability to offer specialized, effective service to customers. He urges the larger organizations to adopt more intelligent merchandising methods if they would hold their share of the business. Good merchandising, including individualized service, is good medicine for any seller—large or small.

• • •

What Did It Accomplish?

Several weeks ago, when we referred to the then approaching Berry conference as a "farce," we used the word in its figurative sense. We could not know at that time that the actual event was to deteriorate into a farce in the literal sense of the word. If the farcial fiasco at Washington last Monday (p. 20) proved anything, it proved that there is no desire or interest on the part of any substantial sector of American industry for a revival of NRA under the auspices of Major Berry. The Major's party cost American industry something over a quarter of a million dollars. That amount of money, if expended intelligently in the pursuit of business, might have resulted in orders that would have contributed tangibly to the progress of recovery. There are many things that can be done better at home than in Washington.

• • •

A Department on Finishes

In this issue, STEEL inaugurates a department "Surface Treatment and Finishing" (p. 40) to aid consumers in selecting the finishes best suited to their particular needs and to keep them informed of new developments in the field of finishing. Undoubtedly readers have noted that in the past few years STEEL has been presenting more and more information on this subject. The new department will be helpful in concentrating this type of editorial material under one head and in an established place in the book. The articles are obtained from authoritative sources and are handled by a staff writer, who through long specialized experience in the field of finishing, is competent to know the type of information that will be valuable to readers.

• • •

Ford Springs a New Idea

Do not fail to read the description of the modern wide strip mill recently installed in the steel plant of the Ford Motor Co. at Dearborn, Mich. It will be worth your while to ponder over the significance of the fact (p. 30) that most of the strip produced will be finished in coil form. Contrast the operations, from mill to fender presses, required for coiled strip as compared with those for flat material. In this comparison is an idea which may spread to other applications. The recent history of flat-rolled steel is replete with suprises and innovations. This latest Ford development has far-reaching possibilities. It adds an important chapter to continuous mill practice.

E. L. Shaner

Carnegie-Illinois To Make Merchant Iron at Cleveland

CARNEGIE - ILLINOIS STEEL CORP. has taken over the former Central blast furnace plant of the American Steel & Wire Co. in the upper Cuyahoga valley district of Cleveland, and shortly after Jan. 1 will light a stack for the production of foundry, malleable, bessemer, and basic iron for the merchant trade.

This step by Carnegie-Illinois, a subsidiary of the United States Steel Corp., is another manifestation of aggressiveness following the recent unification of the two leading steelmaking units of the Steel corporation.

From this Cleveland stack Carnegie-Illinois will compete with water shipments to the important merchant iron trade of the Great Lakes region, including the lush automotive market.

Sales will be directed by James S. McKesson, formerly vice president of the Corrigan, McKinney Steel Co. in Cleveland, and several months ago placed in charge of all pig iron sales of Carnegie-Illinois.

Originally there were four stacks at the Central furnace plant in Cleveland, supplying hot metal to the Newburgh steelworks of the American Steel & Wire Co. At the depth of the depression the plant was closed and semifinished steel has since been brought in from the National Tube Co. works at Lorain, O.

Two Furnaces Scrapped

Two stacks—A and C—were sold to the American Salvage & Trading Co., Cleveland, for scrapping. This has been practically completed. Stacks B and D remain. The latter is to be rehabilitated at an approximate cost of $100,000, and will be lighted as soon as possible. Stack B will be held in reserve.

The annual capacity of stack D, about to be relighted, is 255,000 tons, and that of stack B 217,000 tons.

A fairly large stock of iron ore, a holdover from American Steel & Wire Co. operations, is on hand. An operating staff will be under the direction of the Pittsburgh office of Carnegie-Illinois, and there will be no operating headquarters in Cleveland.

So far as known, this is the first blast furnace stack to be operated for the merchant iron trade by any subsidiary of the Steel corporation in the Great Lakes district. It indicates abandonment of a plan to ship iron over the Corporation-owned Bessemer & Lake Erie railroad from Pittsburgh to Conneaut, O., and then by water to lake destinations.

At present the Interlake Iron Corp., with headquarters in Chicago, is the outstanding merchant producer in the lake region. Its two Federal stacks at South Chicago, Ill., have an annual capacity of 421,200 tons, its two stacks at Toledo, O., 513,000 tons, its Perry stack at Erie, Pa., 167,400 tons, and its Zenith stack at Duluth 113,400 tons. Of these Interlake stacks, the two at Toledo and the Perry and Zenith stacks are in blast.

Youngstown Sheet & Tube Co. operates its Iroquois blast furnace plant at South Chicago, Ill., as a merchant proposition, having a capacity there of 602,400 tons annually. Two of these three stacks are now in blast.

Practically all steel manufacturers in the lake area sell more or less pig iron.

National Steel Corp. has two of its four stacks at Buffalo now active, about half of their product shipped to foundries. The two Zug Island stacks of National at Detroit supply hot metal for the Great Lakes Steel Corp. open hearths, and National has been shipping cold iron by water from Buffalo to its Michigan customers.

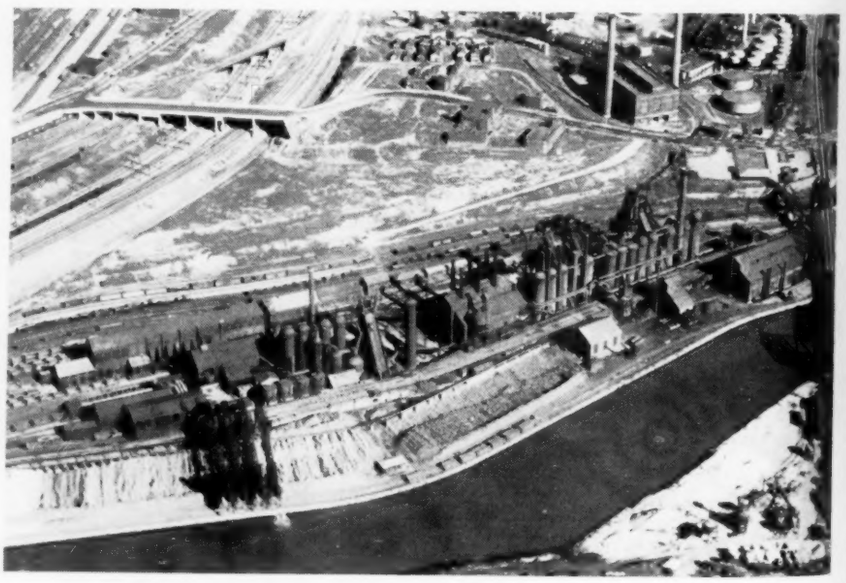
International Harvester Co.'s Wisconsin steelworks in Chicago, two of whose three stacks are now on the active list, sells about half of its output in the merchant market.

Republic Steel Corp., both of whose Donner stacks at Buffalo are on, is a merchant seller.

So is Republic's Corrigan-McKinney division at Cleveland, all four of whose stacks are on.

In the Pittsburgh district, Carnegie-Illinois now has three stacks on merchant iron.

Where Carnegie-Illinois Will Make Merchant Iron



Air view of the Central Furnace plant at Cleveland, formerly operated by the American Steel & Wire Co. but now taken over by the Carnegie-Illinois Steel Corp. Both are subsidiaries of the United States Steel Corp. The two stacks at the left have been razed. One of the two at the right will be rehabilitated for the production of merchant pig iron. Photo by Aerial Surveys Inc., Cleveland, by courtesy American Steel & Wire Co.

United Bids for Mackintosh Plant

MACKINTOSH-HEMPHILL CO., Pittsburgh, in federal court at Pittsburgh, Dec. 7, revealed an offer from United Engineering & Foundry Co., Pittsburgh, for the purchase of its Wooster, O., plant.

The offer came to light in connection with proceedings under way on the company's petition to enter voluntary bankruptcy and which the

bondholders' protective committee is attempting to block.

Federal Judge Robert M. Gibson has set Dec. 23 as the time at which stockholders and creditors will be given opportunity to state their views regarding the sale. It is believed the offer is around $550,000 for this one division. Mackintosh-Hemphill in addition operates two other divisions, at Midland, Pa., and in Pittsburgh.

The company's management, through J. S. Ervin, president, states that the sale of the Wooster plant would enable the company to take care of a portion of its sinking fund requirements, to make bond payments, and to formulate plans of reorganization and continue as a going concern.

Should United Engineering & Foundry purchase this division, it would give the company an important entry into the midwestern machinery market.

On Dec. 11 the Mackintosh-Hemphill management sent out letters over President Ervin's signature stating "that creditors would have to show in court on Dec. 23 why the Wooster, O., division should not be sold to United Engineering & Foundry Co."

Size vs. Service a Modern Version of Goliath vs. David

BY CHARLES WOODWARD

FOR many years I have preached the doctrine and proved the fact that there is something more to selling than price, quality of merchandise, or magnitude of the concern which a particular salesman represents.

These factors—and others of similar importance—are always interesting. When competition outbids, outguesses, or outplays us here and there, however, the strength of our position is put to the real test.

Nowadays we are dealing with organized, well-informed merchants, manufacturers, and agriculturists who discuss their industry problems periodically and in groups. These associations are also considerably influenced by the leadership of independent, clear-thinking men.

Result: As time advances we are forced to realize that high pressure salesmanship, a cut price now and then, any of the old tricks which used to work, fail to increase or even maintain either customer lists or sales.

Relatively few large corporations have realized the significance of these facts to an extent where they are placing that most valuable, most difficult-to-attack asset, "Good will," above asking for and expecting to receive business.

An extensive survey of merchants, large and small, indicates that the larger corporations are in this respect often the most arrogant and demanding. Consequently, they are most vulnerable to the more intelligent salesmanship, service and goodwill-building efforts of smaller unit competition.

Tremendous inroads are being made into big business by these smaller concerns, which lack financial strength, offer a limited line of products, and spend incomparably less per unit of value to sell their output.

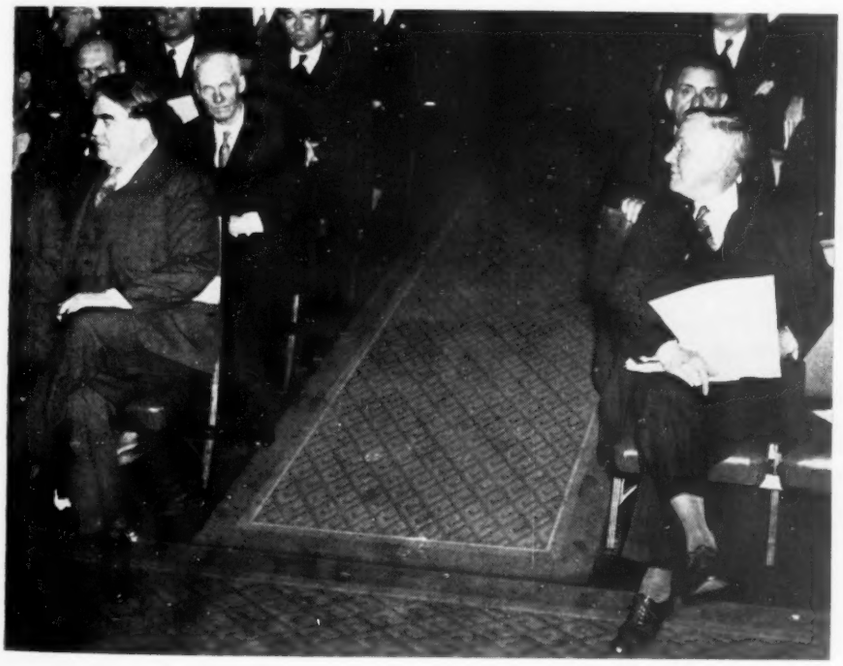
Soft-Pedal Persuasion

The most successful of these place service, the kind that counts but costs less, above persuasion of any sort. They have learned from the buyer of every size, anywhere, that he is not at all impressed by the magnitude or importance of any manufacturer who takes his money for merchandise.

By their failure to recognize the fact that hundreds of smaller concerns are running rings around them, making it increasingly harder to do business at a profit, the big corporations are encouraging the creation of more and more of these smaller fast-stepping units whose operating experience and earlier sales experience has all been paid for by the large concerns with whom they are successfully and profitably competing.

These things happening everywhere in America, have given rise to the remark so frequently heard that, "now is the opportunity for the small manufacturer who knows his business." Proof of the statement lies in the fact that hundreds of them are operating successfully and making money. With business on the upswing of a new cycle they will increase rather than diminish and

An Aisle That Is Miles Wide



Only the width of an aisle separated John L. Lewis, head of the Mine Workers union (left), and William Green, president of the American Federation of Labor (right), at Major Berry's industrial labor conference in Washington last Monday, but mentally they were miles apart. Two weeks ago Mr. Lewis resigned as vice president of the A. F. of L. to head up the faction within the federation that is for organizing labor in steel, automobiles, textile and other major industries in vertical unions. Mr. Green remains the champion of the craft type of union. Last week the railroad brotherhoods went into Mr. Green's corner and Washington is betting on him for the long pull. Acme photo

each newcomer takes another bite out of one of the big brothers.

With everything at their disposal, manufacturing experience, equipment to supply anything in their respective lines, branch plants and district offices at strategic points, money to pay for the best talent available, many of our large corporations lumber placidly on, blinking at facts they are aware of, losing business where they should not; doing nothing constructive about it.

Faulty Direction To Blame

Well—there's a way. A leaf from the book of those more successful saleswardly would help more than any one thing. Blacksnaking the salesmen won't do it. In fact, a good many big sales organizations will have to go completely into reverse from present methods. After a thorough mental purging these same salesmen—those who can take it—will do what's expected of them, asking no quarter. If they are failing today, the fault, as in a ball team or any army, lies higher up.

No miracle workers are required for these jobs. Just some application of the fundamentals of better merchandising, inevitably employed by every outstanding successful producer of steel, silk or potatoes.

Transportation

APPROXIMATELY one out of every eight tons, or more than 12 per cent, of freight hauled by Class I railroads in the first half of 1935 was directly due to activities of the steel industry, according to the American Iron and Steel institute from data released by the interstate commerce commission.

Out of a total of 363,374,105 tons of freight carried by the railroads during the period, 27,964,000 tons consisted of shipments of iron ore, coal, limestone and other raw materials to iron and steel manufacturers. Another 16,670,000 tons consisted of shipments of finished iron and steel from the mills to their customers.

In addition, the railroads hauled large tonnages, indirectly traceable to the activities of the steel industry, in the movement of many kinds of goods fabricated from steel and iron by customers of the industry.

For hauling the freight directly created by the steel industry the railroads received in freight revenues during the first six months of this year a total of $108,099,000, nearly 9 per cent of total freight revenues during the period.

Nearly 1,000,000 freight cars were required to bring raw materials to the steel industry and haul away the finished steel. Almost 533,000 cars were loaded with the raw materials during the period, while shipments of finished products of the industry filled 455,000 cars.

J & L FLEET TO SOUTH

Jones & Laughlin Steel Corp., Pittsburgh, dispatched a fleet of ten barges loaded with steel products from its Aliquippa, Pa., plant on Dec. 12 for destination to various southern points.

Labor

LABOR'S share of each dollar received by the steel industry from the sale of sheet steel was 17 per cent greater in 1934 than it was in 1929, according to the American Iron and Steel institute from data supplied by one prominent and typical manufacturer.

In 1934, payrolls took 38.2 cents out of each dollar of sheet sales, compared with 32.6 cents in 1929. Over the 12 years, 1923-1934, payrolls averaged approximately 36.6 cents out of each sheet steel dollar.

From 1923 to 1934 sheet steel prices declined 46.5 per cent, although great improvement was made in the quality of the sheets produced during the period. The steel industry received an average of $100.15 per ton of sheets in 1923, but in 1934 the average price received per ton of steel sheets sold was only $53.66.

The sharp decline in sheet prices has greatly reduced the steel industry's income from the sale of this product. Although production of steel sheets in 1934 totaling 3,203,000 tons was only 8.6 per cent below 1923 when 3,503,000 gross tons were produced, estimated gross sales value of the product declined 51 per cent during the same period.

A. F. OF L., PLEASE NOTE

John Lenhart, for many years an employe of the H. C. Frick Coke Co., subsidiary of the United States Steel Corp., liked his employer well enough to bequeath him his estate of $5000 after the death of certain relatives, who in the meantime will receive the income from it. In his will filed for probate last week at Uniontown, Pa., Mr. Lenhart explained he was making the Frick company the ultimate beneficiary "because of the many kindnesses it has bestowed upon me".

SURPLUS CARRIES INSURANCE

Surplus of the Weirton Plant Employes' Relief and Beneficial association, of the Weirton Steel Co., Weirton, W. Va., has been built up to the place where the December premium payments to insurance companies can be paid out of surplus. This is the second time in 1935 that the surplus has carried the load, enabling employes to obtain a year's benefits for 10 payments.

FEDDERS LIFTS WAGES 5%

Fedders Mfg. Co. has announced a 5 per cent wage increase for all workers in its Buffalo plant receiving $50 or less weekly. The increase goes into effect Jan. 1. The company produces automobile radiators and metal specialties.

LABOR WINNING CONTESTS

Since Jan. 1 workers have won 63 per cent of wage, hour, and working condition disputes, the highest per cent of employe victories since 1917, according to the Personnel Research Federation, New York. Compromises and miscellaneous jurisdictional disputes are not considered in this compilation.

Meetings

PURCHASING AGENTS' association of Pittsburgh will hold its Christmas party at 6:30 p.m., Dec. 17, at the Pittsburgh Athletic club.

IRON AND STEEL ENGINEERS GO TO DETROIT IN 1936

Association of Iron and Steel Engineers, 1010 Empire building, Pittsburgh, has selected Detroit and Sept. 22-25 as the place and time for its 1936 convention and exposition. The convention, under the direction of J. A. Clauss, chief engineer, Great Lakes Steel Corp., Detroit, who will be general chairman, will be held at the Statler hotel. The exposition will be housed in Convention Hall and over 150 manufacturers of steel and equipment are expected to exhibit.

News Oddities

FATHER James R. Cox, Pittsburgh priest who in 1932 led part of the bonus army to Washington and is now lining up a new army for the Townsend pension plan, was speaking a week ago Sunday on the evils of mechanization in industry.

"Thirty years ago at a mill behind our chapel it took two men ten hours to produce five tons of iron," said Father Cox. "Now, a puddling machine produces 5000 tons of puddled iron in five minutes."

Five thousand tons of puddled iron in five minutes equals 60,000 tons per hour. In an 8-hour day this means 480,000 tons. Assuming a 5-day week, the weekly rate is 2,400,000. In operating 52 weeks, the annual rate would be 124,800,000 tons.

According to the American Iron and Steel institute statistical reports for 1934, page 28, last year's production of bar iron was 91,353 tons — and this included bolt, nut and

rivet, spike and chain, toe calk, horseshoe, finger, staybolt and all other miscellaneous bars. This brobdingnagian mill in Pittsburgh theoretically could have turned out all last year's production in 1 hour, 30¼ minutes.

SANTA A BIG USER OF STEEL

Toy automobiles, velocipedes, and scooters for this year's Christmas trade required 20,000 tons of steel, chiefly sheets and strip, the American Iron and Steel institute estimates. A considerable tonnage also has been consumed for other kinds of toys. In addition to sheets and strip, many toys are made from tin plate, black sheets, welded tubing and cast iron. Of the thousand toy factories in the country, half are thought to be manufacturing steel toys.

Financial

EXTRA dividends and declarations on account of accumulations continue the rule. Last week these were ordered:

Youngstown Sheet & Tube Co., Youngstown, O., quarterly of $1.37½ on its preferred, payable Jan. 1 to record of Dec. 21. This reduces the arrearage to about $19.

Spang, Chalfant & Co., Pittsburgh, $2.50 payable Dec. 30, and $1.50 payable Jan. 1, both to record of Dec. 16. Previously this year $3.50 was paid on the preferred arrearage.

Standard Steel Spring Co., Coraopolis, Pa., special of 25 cents a share, payable Dec. 24 to record of Dec. 20. The company has been paying 25 cents per quarter regularly.

Briggs Mfg. Co., Detroit, extra of 50 cents payable Dec. 31 to record of Dec. 20.

Lunkenheimer Co., Cincinnati, extra of 10 cents payable Dec. 26 to record of Dec. 16.

HEAR SYMINGTON PLAN DEC. 18

Hearing on the reorganization plan of the Symington Co., Buffalo, and Gould Coupler Co., Buffalo, has been adjourned until Dec. 18.

CAR & FOUNDRY LOSS GROWS

American Car & Foundry Co., New York, reports net loss, after charges, of $1,731,318 in the six months ended Oct. 31, compared with deficit of $330,753 in the comparable period of 1934.

ORDERS STOCK DIVIDEND

Motor Products Corp., Detroit, has declared a 100 per cent stock dividend on its common and also voted a cash disbursement of 50 cents to be paid prior to the stock distribution and two payments of 50 cents each on the new common, one payable March 31 and the other, June 30.

Farrell and Thomas See National Recovery Through International Trade Expansion

JAMES A. FARRELL, chairman of the National Foreign Trade council and former vice president of the United States Steel Corp., in an address delivered at the twenty-second National Foreign Trade convention in Houston, Tex., recently thoroughly condemned those self-sufficientists in the United States who believe that the only alternative to our present foreign commercial policy is that of extreme nationalism.

Expressing a belief that rugged individualism still exemplifies the spirit of the American people, Mr. Farrell said that our national commercial policy, embodied in the provisions of the reciprocal trade agreements act, aims at national economic recovery through an expansion of trade between all nations, and not through a policy of economic self-containment. He said:

"According to one nationalistic writer, in the analysis of trade agreements, Brazil, for example, has exported little or no manganese to the United States for several years. This is a superficial and distorted statement. Brazil, prior to the tariff increase in the 1930 tariff act, was an important supplier of manganese to the United States, and despite this tariff increase, has continued the supply. Aside from this, American owners of manganese, essential in the manufacture of steel, have thought it advisable to conserve supplies in the event of a situation arising similar to that during the World war."

Mr. Farrell went on to say that three of our leading agricultural commodities—cotton, grain, and tobacco—are at present adversely affected by domestic policies which have caused a decline in sales abroad that involve the livelihood of millions of our people, and if national recovery depends upon freer exchange of goods and services, our commercial policy must seek an increase in imports and exports. The greater part of the world is living under the delusion that economic nationalism is a paying adventure.

Sees Need for Co-ordination

Eugene P. Thomas, president of the National Foreign Trade council and vice president of the Steel corporation, gave an address at the same convention, in which he stated that "those who mistakenly assume that America's progress economically denotes a trend toward national isolation, will find in the large number of foreign representatives here at this convention evidence of the interest of other countries in the international character of the discussions, and of the international attitude of American business in its approach to problems affecting the commerce of all nations."

The time has come, Mr. Thomas said, to dissipate the policy of "separate camp" relations between industrial and agricultural interest of the United States, and achieve a unison of economic thought.

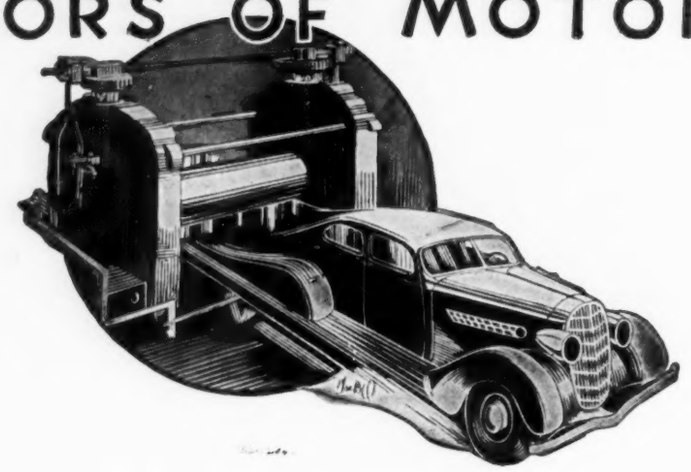
Steps have been taken by the National Foreign Trade council to organize an economic mission to the Latin American countries, comprised of a selected group of men individually qualified for the important task and representative of the leading industries of the United States. This mission will leave the United States not later than March.

It is in the Latin-American countries that many government officials see the most promising outlook for increasing exports of iron and steel products.

A Public Works Buy

This steel gantry, 196 feet high, is one of three used by the contractors in driving sheet steel piling for the cutoff wall on the Fort Peck dam project in Montana. The piling is driven 135 feet to firm shale

MIRRORS OF MOTORDOM



DETROIT

THE father of the steel stamping industry—whoever he was, but it is certain that he now rests in peace—would turn over twice if he knew some of the tricks the automobile industry is doing now with steel sheets.

Suppose that mythical gentleman had gone to his rest a short decade ago. Before he departed this vale, his latest recollections would be of "flat" fenders, square cut quarter panels, flat running boards, flat tops.

Everything ran to square cuts, right angles. Obviously, these were the easiest stampings to make. Some of those flat fenders a few years ago actually flapped in the wind. The square-cut diamond had nothing on the forerunner of today's automobile.

Most of the panel work was an eye-sore. Headlamps bulged, bodies were straight-up-and-down, and the so-called "mud-guard" failed to conceal any of the car's undertrappings and vitals.

Become Curve Conscious

Generally speaking, the motor builder may have taken in Ziegfeld's Follies on occasions, but when he got back to the designing room it showed he didn't believe in curves.

Today, the automobile is the very essence of curves. There is the pontoon-type fender, which practically all have, there is the one-piece hood like the Lincoln Zephyr, the one-piece steel top, or the difficult sheet draw to make a sloping rear panel like the Chrysler Airflow. It's all one succession of curve, bend, and slope.

Verily, steel has put the modern automobile over. Without drawing qualities, sheets could never have been put to the task. The automobile industry is indebted to steel for the transition that, in a nutshell, makes everything on the streets over five years old look like a hack.

The 1936 cars, to pick out one feature, have practically all gone to the "hog-backed" type front fender, and, where the rear fender shows, this same center high-point ridge or crest has been put in.

The layman accepts such in passing, but there is a lot more to it. For, after blanking, the fender is formed in halves by most manufacturers, then welded down the crest. However, this adds a lot to costs, especially the expense of welding. Up at Flint, Buick has got something this year on front fenders that has them all talking.

To make the front fenders, Buick had City Machine & Tool at Toledo build a new type die that virtually elliminates breakage and minimizes power-hammering.

It's a floating-cam-type rotating-draw die, and it makes the Buick fender in one piece. It makes the crown, apron, and skirt by rotating the stock. They say that power hammering has been cut to a bare 4 cents per fender. This, plus the breakage minimum feature, is, to use the vernacular, something.

The draw die uses a sheet about 55 or 60-inch by 38 to 40-inch for this one part. Olds and other subsidiaries of General Motors are watching the operation's success. Steel has a stake in it too, for anything that cuts breakage down is heaven-sent.

25 Per Cent to Scrap Pile

Breakage and scrap loss play a big part behind the scenes in motordom. Few realize that one out of every four tons of new finished steel that is shipped into Detroit's motor plants comes out shortly as scrap.

In other words, scarcely an automobile builder today can cut its scrap loss below 25 per cent. He may shade this on a part here and there, but the complete car represents a steel scrap loss that runs to a ratio of one ton to four.

Even such a growing practice as blanking by the steel mills fails to eliminate all this loss. Many of the mills have been offering to blank out the first operation at the mill for their customer. Indeed, some mills have gone even farther than offering the service, they have had salesmen out actually soliciting blanking business.

In the squeeze, of course, is the independent stamping shop, also a customer of the steel mill; therefore few can see the logic of this added service to the automobile industry. But it does cut down scrap loss.

In any event, blanking by the steel mill is no cure-all. Consider the case of one important car builder in the middle-priced field. The first operation on its new pontoon-type fender is performed for it by the steel mill so that it comes to the press shop, weighing 50 pounds. The finished fender weighs 38 pounds, a loss of 12 pounds net, or 26 per cent. This same company, on the other hand, has worked down its scrap loss on its quarter panels to 15 per cent, which is no mean achievement.

Mills Allow 3 Per Cent

In scrap loss, the steel industry does, and yet it does not, have a lot of grief. As steel is shipped to a motor plant it is allowed a 3 per cent margin for spoilage, defects, breakage, etc. Over and beyond the 3 per cent is subject to either rejection or adjustment.

But, if the steel works in the dies and holds to within the 3 per cent on spoilage, it is up to the car manufacturer to devise ways and means of shaving down on the 25 per cent figure. The latter falls entirely in his lap. Some even would like to get down that low.

There is the case of a wheelmaker here whose scrap loss is now running 40 per cent and causing headaches. Many times when a new set of dies is being tried out, scrap losses run as much as 75 per cent, and this is no fault of the steel.

As if there were not enough stamping troubles incidental to catering to the whims of the buying public, the motor industry is planning a widespread adoption of the

combination front fender and headlamp next year.

Pierce-Arrow pioneered it 28 years ago and was the only one with this mark of distinction up until the last couple seasons. Then, forecasting the trend, Willys, Chrysler Airflow, De Soto, Lafayette, Cord, and Lincoln Zephyr came forth in quick succession with the front fender headlamp.

A number of designers are working on its wider adoption for 1937. For one major reason it harmonizes with streamlining. Too, the lower headlamps are dropped forward in the fender the closer they come to the road. No better move could give excellent night vision and, at the same time, eliminate glare.

General Motors may go to the idea in 1937, at least on one of its cars. The move would not be an unnecessary change, but one with a practical motive. But to do it the stamping trade will be called upon to meet some new problems.

The steel industry and the power-press manufacturers will be called on to make this part in one piece, such as Lincoln is now experimenting with in its own plant on the Zephyr.

To make the Zephyr front fender to date, Lincoln has been drawing out a conventional fender, then cutting away a diamond shape just forward of the crown. The lamp is drawn separately, then welded in.

Intricate Drawing Operation

Lincoln at present is considering plans to buy dies which will permit this job to be stamped and drawn from one piece of steel. The last couple weeks it has had a sample die worked up, made to one quarter-scale, which should show clearly what problems there will be in this job. Among other things, it entails a difficult operation of first, stamping the fender, drawing the crown, then holding this draw to work out the lamp last of all. Obviously, while the operations are leading up to the latter, "bunched metal", which is parlance for the lamp-to-be, must be held static.

Realizing the seriousness of this manufacturing operation, Lincoln has been calling in outside sources of supply and asking them to submit estimates. For many years Lincoln has always made its own fenders, but this change will mean a sizable die expenditure.

Estimates from $35,000 to $50,000 for only one Zephyr front fender die alone have been submitted, and this is only part of the expense.

More and more the motor makers are focusing attention on the commercial car business. As business the country over revives, they feel there will be a vast amount of new commercial car fleets to be bought.

Last week Plymouth came out with the announcement that for the first time in its history it would make a ½-ton commercial car. Designed to carry all kinds of light freight, the new Plymouth commercial has a rear door, opening into a compartment 69 inches long, 49½ inches wide, and 44 inches high.

Like other Plymouths, it has an all-steel body, hydraulic brakes, and a six-cylinder completely water-jacketed motor.

As this department said a week ago, Olds will soon be another to join the swim. It will bring out a 1-ton commercial, dropped exactly between Chevrolet's ½-ton and 1½-ton trucks.

Five Lead Commercial Field

All in all, there are some 20-odd makers of commercial cars in the company, but five account for nearly 90 per cent of the total. In 1935 the leaders in order have been Ford, Chevrolet, Dodge, International, and G. M. C. These are the big five, but also prominent are White, Reo, Studebaker, Mack, Diamond T, and Autocar.

The first nine months of 1935 saw 399,000-odd commercials registered in the country, against 310,000 in 1934, which is a clear gain of 28 per cent. Now that statistics show that retail trade in 1935 is 15 to 20 per cent better than 1934, merchants are going to have money to spend for commercials in 1936.

Walker Mfg. Co., Racine, Wis., maker of automobile jacks, is dodging a strike by moving at least part of its equipment to Jackson, Mich., where some manufacturing facilities have been engaged.

Apparently, the motor industry has found no more effective means to combat labor agitators than to move out from beneath them. Chevrolet did it effectively at Toledo, and there have been numerous other cases.

Detroit hears that Graham about the first of the month had added up 3681 orders for its 1936 lines, and would hope to produce 3300 in December . . . . that Hupp has gone in on the Graham-Reo die pool whereby, barring the hood dies, panel work in all three will be identical. The body work is being done at Wayne, Mich. . . . . that Ford has been having difficulty recently with the manufacture of its new first and reverse speed gears and that there has been some breakage . . . . that Briggs has been turning out 68 Lincoln-Zephyr bodies daily last week at its LeBaron custom body plant . . . . that the tool and die shops expect to get a volume of replacement business late in December. . . . that shipments of cars by Hudson in November were the largest for that month since 1925, the total being 13,020 Hudsons and Terraplanes. . . . that sales of Olds in November, the first month the 1936 models were shown, were twice those of January, the first month that the 1935 models were offered.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,321
July	229,357	264,933	337,044
Aug.	232,855	234,811	240,051
Sept.	191,800	170,007	89,805
Oct.	134,683	131,991	275,021
Nov.	60,683	83,482	*380,000
11 mo.	1,839,492	2,599,487	3,584,066
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Nov. 30	83,358
Dec. 7	93,180
Dec. 14	98,582

Buys National Drawn Plant

Plant of the National Drawn Steel Co., East Liverpool, O., has been purchased by Pittsburgh Crucible Steel Co., Pittsburgh, a subsidiary of the Crucible Steel Co. of America, and will be operated by the latter. National Drawn Steel Co., which manufactured cold-drawn bars, has not been operated since 1932.

Taylor Society, S.I.E. Merge

Society for Advancement of Management is the name adopted for the merger of the Taylor society, founded in 1915 and having a membership of 400, and the Society of Industrial Engineers, founded in 1918 and having 300 members. Headquarters are at 29 West Thirty ninth street, New York. An election of officers will be held shortly.

Licenses German Mill

Charles R. Hook, president, American Rolling Mill Co., Middletown, O., has announced that Vereinigte Stahlwerke, A. G., (United Steel Works of Germany) had made a license contract with it covering its continuous sheet rolling and cross rolling patents. The license agreement was signed several weeks ago. Construction of a hot-strip mill is now under way at Dinslaken, Germany, while cold reduction units are being built at Wissen.

WINDOWS OF WASHINGTON

WASHINGTON

ANY way you look at it, the Berry industrial-labor conference held here Dec. 9 was a flop. It came about undoubtedly through the fact that Maj. George L. Berry, co-ordinator for industrial co-operation, tried to force the conference on industry when it did not want or believe in the conference.

The steel industry, as such, was not represented at the conference, nor was there a steel round table conference following the opening meeting, and by the same token no representative of steel was appointed to sit with the so-called industrial council which Major Berry will make an effort to organize.

It is reported on good authority that the White House was not pleased at the way the conference was worked out. Major Berry was called over to the White House on Tuesday morning, immediately following the conference, and at the first moment the President returned to his office.

Postponed or Canceled?

Following that it was announced officially that the first meeting of the so-called industrial council, which was to have been held Wednesday, had been postponed for a week. This means either that the administration has decided to pull Major Berry's chestnuts out of the fire or that there never will be a meeting of the council.

As the net result of the conference, several groups of small industries did appoint men to represent them, but these men do not even speak for their small industries.

The iron and steel, lumber, automobile, and cotton textile groups were not represented at the conference and there were no outstanding business men or industrialists who were appointed to meet with the major in further conference.

There was a feeling here last week on the part of some industrialists that there is a nucleus of an idea for the conference, but everyone agreed that Major Berry was not the one to put it over.

When the meeting broke up in a row—as it certainly did—talk was heard in the aisles that Major Berry might be able to handle a labor meeting but he was certainly in no position to handle a gathering such as the 1500 or more that assembled to see what was going to happen.

At the opening of the conference on Dec. 9 Major Berry made a talk in which he asked for the co-operation of business at the round table conferences to follow. However, what he had to say was so insignificant to what actually happened at the conference that little attention has ever been paid in the daily press to his remarks.

Still Wants a "Program"

Major Berry took himself most seriously in parts of his speech, among other things calling attention to the fact that the material submitted at the round table conferences "will be used to compose a national industrial program in the interest of industry; in an effort to re-establish prosperity and stability in our country; and in consequence, of course, a program that will reflect credit and support to the maintenance and stability and perhaps continuity of the nation itself."

At another point in his address he stated the government had no formula to offer and "it is offering no program." In spite of this definite statement, however, the minute some of the round table groups convened they were given a list of subjects to consider consisting, of 13 points.

Immediately after Major Berry had completed his opening remarks, John W. O'Leary, former president of the United States chamber of commerce and head of MAPI, tried to get recognition from the floor, but in the meantime the major had adjourned the meeting. A. P. Haake, of Chicago, representing the National Furniture Manufacturers' association, also tried to obtain recognition but Major Berry would not recognize him either.

At this point someone boosted Mr. Haake on a chair and he made an effort to nominate Mr. O'Leary as temporary chairman of the meeting. This all amidst the greatest confusion, with catcalls, clapping, and booing intermingled. In fact, it looked as though there would be a free-for-all fight before it was over.

Major Berry was still on the platform and he pointed his finger at Mr. Haake and stated that he knew he had been sent there to break up the meeting. Mr. Haake called the major a "liar", the major called Mr. Haake a "liar" and said he would make him eat his words—which, incidentally, he never did. All of this was carried on amidst the utmost confusion all around.

The 1500 or more attending the conference finally became more orderly and went to their respective round table conferences, where the vast majority of the industrialists—that is those that were present—prepared a letter for Major Berry stating in substance that they did not believe their delegates had authority to appoint anyone to the industrial council to represent the industry. By four in the afternoon most of the delegates had left Washington, and the Berry conference as such was over.

Statements Fill the Air

In the meantime, however, Major Berry went on the air with a national hookup and Mr. O'Leary issued a statement.

Mr. O'Leary said that "the industrialists who attended today's meeting did so believing that the vital point of whether it is desirable at this time to form such a council should be fully discussed before its predetermination, and that such discussion was possible only at the ini-

tial session and could not be accomplished after the adjournment to numerous small groups. Many others of industry remained away for fear that their own viewpoint and the viewpoint of those they represent would be subjected to a prearranged procedure, steamrollered through, and the impression given to the public that those who were present indorsed the procedure.

"Industry does demand that where co-operation is sought it shall be on a fair, American basis without benefit of gag rule. We were asked today to accept membership in a broad, powerful, and permanent council without the right to register our views as to the desirability or necessity of such a council. This was the real question at issue and the decision on it was predetermined."

Major Berry cracked right back at the so-called minority. He said that "the tactics pursued were those normally taken by obstructionists to progress whom some people commonly characterize as communists. The difference was that communists usually have a program. These interests were without one and their effort was pathetic.

"I repeat that their attempt to ape the communists was pathetic. To find such peculiar bedfellows seems extraordinary, but perhaps applies to certain interests who so completely forget the sensitiveness of the American people as to associate themselves with those who would destroy our national structure. It presents a sorry spectacle when industry members adopt soapbox tactics."

There were some interesting sidelights at the convention. For instance, during the hour or more that Major Berry spoke in his opening address he never so much as mentioned the NRA. Also in the 13 point program which he sent to the round table conference not a mention was made of NRA.

Diplomatic Corps in Absentia

Seats for the opening meeting were at a premium, and yet the front row in part of the auditorium was set aside for the diplomatic corps. Where the major got the idea that any of the diplomatic corps wanted to attend is beyond the ken of anyone. Suffice it to say, none appeared.

In the front row on the middle aisle John Lewis, fighting for "vertical" organization of labor, sat on one side with Henry Warrum, his counsel, while on the other side of the same aisle in the same row sat William Green, president of the A. F. of L. and defender of craft unionism. This caused much amusement, especially at the press tables, because neither appeared to notice that the other was present.

Incidentally, when the news photographers took pictures of Mr. Lewis they literally stepped over the feet of Mr. Green. Later some of the more daring took pictures of the two men on the two sides of the aisle.

Among steel and allied industries registered at the conference were C. J. Meyer, vice president, Truscon Steel Co.; G. P. Byrne, National Screw Machine Producers bureau; W. S. Thompson, Steel Joist institute; E. B. Abbott, National Corrugated Rolled Metal Culvert Pipe association; Merrill G. Baker, Steel Founders Society of America; F. A. Lorenz Jr., American Steel Foundries; J. R. Dangler, Cast Iron Pipe institute; D. C. Bakewell, Duquesne Steel Foundry; G. Morris, Alloy Casting association; Neal W. Foster, Boston Gear Works; Raymond M. Seabury, Drop Forgings association; R. E. Belt, the Malleable Founders society; F. R. Hoadley, Farrel-Birmingham Co.; W. L. Seelbach, Forest City Foundries Co.; N. S. Washburn, Gray Iron Foundries society; Fayette R. Plumb, Delta File Works; and Benjamin Schwartz, Institute of Scrap Iron and Steel Inc.

MAY TEST TRADE PACTS

A conference of representatives of raw materials whose tariffs have been lowered in recent trade agreements will be held in Washington at an early date to consider moves to test the constitutionality of the trade agreements act.

Free flow of raw materials and special protection for manufactured products has long been advocated and is now being pressed by a group of advisers within the administration.

In a blast at the Canadian trade agreement last week, George N. Peek, who has just resigned from the state department, pointed out that the duty on ferromanganese from Canada was reduced although imports are negligible, but the most-favored-nation clause automatically extends this reduction to other nations which ship in ferromanganese, such as the United Kingdom, the Netherlands, France and Norway.

Died:

GEORGE P. SPEAR, 68, general manager, Corbin Screw Corp., and a vice president of the American Hardware Corp., New Britain, Conn., in that city, Dec. 6. Born in New York, he went to New Britain in 1897 to work for North & Judd Co., later going to the Corbin Screw plant. He had been vice president of the American Hardware Corp. for 30 years.

♦ ♦ ♦

John Marshall Young, 63, inventor and assistant to the president of the American Can Co., New York, Dec. 1. At the time of the organization of the American Can Co. in 1901, he was manager of Norton Bros., Whitestone, L. I., one of the original can manufacturing companies. It is said that Mr. Young was a leader in the development of the system of vacuum packing.

♦ ♦ ♦

William J. Culleton, 64, for many years a plant superintendent for the H. C. Frick Coke Co., Uniontown, Pa., at Uniontown, Dec. 7.

♦ ♦ ♦

Samuel J. Bialosky, 61, for 30 years associated with Bialosky Bros. & Co., Cleveland, scrap iron dealer, in that city, Dec. 12. Mr. Bialosky spent most of his career in the scrap iron business, going to work for his father at the age of 14.

♦ ♦ ♦

Frederick C. Perkins, 65, until his retirement about three years ago a director of the Sharon Steel Hoop Co., Sharon, Pa., and several other corporations, in Jacksonville, Fla., Dec. 9. Mr. Perkins received his B. A. at Yale in 1894 and was graduated from Harvard Law school two years later. He was a former director of the Pressed Metal Radiator Co., the Eastern Steel Co., and the American Regulator Co.

♦ ♦ ♦

Harry Sullivan Endsley, 80, general counsel for the Cambria Steel Co. from 1901 to 1915, in Johnstown, Pa., Dec. 5. Born in Brownsville, Pa., he was admitted to the bar in 1878, moving to Johnstown in 1892. There he succeeded Cyrus Elder as general counsel for the Cambria company, upon Elder's retirement. He was president of the Republic Iron Co. of Michigan, an iron ore subsidiary of the Cambria company, and also of a number of Johnstown companies.

♦ ♦ ♦

William J. Kirby, 66, president, Somerville Stove & Iron Works, Somerville, N. J., Nov. 27. A well-known foundry engineer, Mr. Kirby was born in Baltimore county, Maryland, and after a common school education began his career as an apprentice in the molding trade. He rose to the superintendency of the Henry McShane Mfg. Co., Baltimore. In 1905 he located in Somerville and developed the stove and iron works there. Mr. Kirby rendered many public services, and was identified also in recent years with many commercial enterprises, other than his foundry. He was a member of the Engineers Club of New York.

Issue Turnbuckle Standard

A proposed federal specification for turnbuckles has been prepared by the federal specifications division, treasury department. Copies may be had by addressing the division, Federal Warehouse, Room 751, Washington, and comments and criticisms from interested parties are invited.

Production

CURTAILMENT in schedules in the Pittsburgh, Chicago, eastern Pennsylvania, and New England districts tended to pull the steelmaking rate down 2½ points last week to 54½ per cent. Two-point gains at both Youngstown and Cleveland failed to offset this decline. Other districts held fairly steady. Tentative schedules indicate a slightly easier situation this week. Further details follow:

Youngstown — Gained 2 points last week to 62 per cent. Despite a scheduled decline of 1 point this week, the mills are operating on the strongest mid-December schedules in a number of years.

Chicago—Declined 4 points to 59 per cent as a result of a curtailment by one interest. This recession is regarded as seasonal and a larger decrease is in prospect by the end of December. Blast furnace schedules are steady, however, with 19 of 41 stacks active.

Pittsburgh—Down 1 point to 42 per cent last week. The rate of all Corporation subsidiaries last week was off fractionally to 32 per cent, whereas for the leading independent it was unchanged at 51 per cent. According to present plans, operations this week may show a further slight decline.

Twenty-eight out of 60 steelworks blast furnaces continue active but a few are cutting back blast. Carnegie-Illinois has 12 of 32 on, Jones & Laughlin 8 of 11, National Tube 1 of 4, and Pittsburgh Crucible Steel, American Steel & Wire, and Pittsburgh Steel, each 1 of 2. At Johnstown, Pa., Bethlehem has 3 of 7 on.

Wheeling—Unchanged at 78 per cent. Twenty-nine out of 37 open-hearth furnaces continue active.

Buffalo—Steady at 47 per cent. Little change is expected prior to the brief Christmas holiday. Bethlehem is preparing its No. 2 open-hearth battery of ten additional units for production at Lackawanna, and operations are expected to increase substantially after Bethlehem's new strip mill goes into production.

New England—Down 11 points to 82 per cent last week, with schedules for this week indicating little change.

Central eastern seaboard—Dropped 2½ points to 37 per cent, with the possibility of a further decline over the remainder of this month.

Cleveland-Lorain—Up 2 points to 84 per cent, Otis Steel Co. lighting another open hearth to operate all of its eight units, Republic Steel Corp.'s Corrigan, McKinney plant continuing with all of its 14, and National Tube Co., Lorain, with 11 of 12. The latter's bessemer converter operated double turn last week, and its rail mill, seven days. Blast furnaces active: Republic's four stacks, Otis Steel's two, and National Tube's three out of five.

Detroit—Unchanged at 94 per cent, there being 16 out of 17 open-hearth furnaces on.

Birmingham—Continued at 56 per cent last week. Several open-hearth furnaces are in shape for a week or ten days steady operation, in addition to those now making steel.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Dec. 14	Change	Same week 1934	Same week 1933
Pittsburgh	42	— 1	24	28
Chicago	59	— 4	35½	29½
Eastern Pa.	37	— 1½	19½	23
Youngstown	62	+ 2	39	36
Wheeling	78	none	70	41
Cleveland	84	+ 2	59	59
Buffalo	47	none	24	25½
Birmingham	56	none	32½	52
New England	82	—11	47	71
Detroit	94	none	59	52
Average	54½	— 2½	33½	33

CORPORATION SHIPMENTS HEAVIER IN NOVEMBER

Although shipments of finished steel by the United States Steel Corp. in November, 681,820 tons, were 4921 tons lower than the 686,741 tons shipped in October, the daily rate of shipments in November was the larger. With 26 working days in October the daily rate was 25,434 tons; with 26 working days in November the daily rate was 26,224 tons. Had November had the additional day to balance October the total shipments would have been 708,044 tons at the same rate. In November, 1934, shipments were 366,119 tons. For 11 months this year the total is 6,709,784 tons, compared with 5,507,243 tons shipped in the same 11 months of 1934.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1935	1934	1933	1932
Jan.	534,055	331,777	285,138	426,271
Feb.	583,137	385,500	275,929	413,001
March	668,056	588,209	256,793	388,579
April	591,728	643,009	335,321	395,091
May	598,915	745,063	455,302	338,202
June	578,108	985,337	603,937	324,746
July	547,794	369,938	701,322	272,448
Aug.	624,497	378,023	668,155	291,688
Sept.	614,933	370,306	575,161	316,019
Oct.	686,741	343,962	572,897	310,007
Nov	681,820	366,119	430,358	275,594
11 mo.	6,709,784	5,507,243	5,160,313	3,751,646
Dec.		418,630	600,639	227,576
Yrl. adj.		19,907	44,283	5,160
Total		5,905,966	5,805,235	3,974,062

Activities of Steel Users and Makers

WOODWARD IRON CO., Woodward, Ala., announces appointment of F. W. Marshall & Co., Pennsylvania building, Philadelphia, as sales agent for Woodward pig iron in eastern seaboard territory. Edward Leb. Marshall, F. W. Marshall & Co., is now a resident of Boston, 105 Pinckney street, and will follow the New England trade.

Kerchner, Marshall & Co., with offices at 1415 Oliver building, Pittsburgh, and 629 Union Trust building, Cleveland, will carry the agency for Woodward pig iron in the Pittsburgh and Cleveland territories.

These appointments became effective Dec. 1.

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Claud S. Gordon Co. has removed its laboratory and office to 1524 South Western avenue, Chicago.

♦ ♦ ♦

William Leard Co. Inc., New Brighton, Pa., has appointed Theodore L. Dodd & Co. sales representative, with offices at 80 East Jackson boulevard, Chicago.

♦ ♦ ♦

United States Fuel & Iron Co., Pittsburgh, representing shippers of iron, ferroalloys, ores, coal, coke and scrap, has opened up a district office at 225 Rockefeller building, Cleveland. Horton Penrose is district manager.

♦ ♦ ♦

H. A. Wilson Co., Newark, N. J., manufacturer of thermostatic bimetal and electrical contact points, has begun an expansion program, involving a three-fold increase in manufacturing capacity. Equipment for a complete new plant is being installed.

♦ ♦ ♦

Caterpillar Tractor Co., Peoria, Ill., announces that Machinery & Welder Corp., 240 South Boyle avenue, St. Louis, has been granted a selling franchise for sales of electric welding units mounted on Caterpillar tractors to railroads and other corporations in Illinois, Missouri, Kansas, eastern Iowa, southern Wisconsin, northwestern Indiana and the upper peninsula of Michigan.

♦ ♦ ♦

A. M. Castle & Co., Chicago, announces the inauguration of a new service to the trade. Realizing the importance of the development of special products, including alloy steels and nonferrous metals, it has made two divisions in its organizations, namely, a special products di-

(Please turn to page 79)

Industrial Men in the News

John P. McCaslin, Superintendent of Bar Mills, Duquesne Works of Carnegie-Illinois Steel Corp.

He succeeds W. W. Hill, who has retired after 43 years of continuous service.

Since 1916 he has been at Cleveland with Corrigan-McKinney, chiefly in charge of its mills.

In previous connections he held posts of rolling mill, open-hearth and general superintendent.

JOHN P. McCASLIN has been appointed superintendent of bar mills at the Duquesne works of Carnegie-Illinois Steel Corp., succeeding William H. Hill, whose retirement was noted recently in STEEL. He goes to Carnegie-Illinois direct from Corrigan, McKinney Steel Co., Cleveland, where since 1933 he has been general superintendent.

Mr. McCaslin was rolling mill superintendent of the Cambria Steel Co., Johnstown, Pa., from 1914 to 1916. He left the Cambria organization to accept the position of rolling mill superintendent of Corrigan, McKinney Steel Co. in the latter year. Subsequently he was promoted to the position of superintendent of rolling mills and open hearths, and in 1933 was appointed general superintendent.

♦ ♦ ♦

Harry Ross Jones, Canton, O., has announced his retirement from active work in the steel industry, effective Dec. 31. Mr. Jones was formerly president of the United Steel Co. and of the United Alloy Steel Corp., Canton, O., and for the past three years has been engaged in organizing the alloy steel division of the Youngstown Sheet & Tube Co. He is one of the pioneers in the manufacture of alloy steels.

William J. MacKenzie, who has been assistant to Mr. Jones for the past three years, and formerly was vice president of the Interstate Iron & Steel Co., now part of the Republic Steel Corp., succeeds Mr. Jones as head of the alloy division of the Youngstown Sheet & Tube Co. Mr. MacKenzie is a metallurgist by training and has spent practically all of his business life in the alloy steel business.

♦ ♦ ♦

C. C. Henning, assistant general metallurgist of Jones & Laughlin Steel Corp., Pittsburgh, has been awarded the Robert H. Hunt award for his paper on "Manufacture and Properties of Bessemer Steel". This is the annual prize given by the American Institute of Mining and Metallurgical Engineers for what is considered to be the best technical paper of the year on the manufacture of iron and steel. The paper was presented by Mr. Henning in February, 1935, in New York in connection with a meeting of the iron and steel division of the institute, of which he is a member.

C. C. Henning

Mr. Henning has been identified with the Jones & Laughlin Steel Corp. during practically his entire business career. He joined the company in June, 1915, in the metallurgical department of the Pittsburgh works, and has advanced since through various capacities to his present position. He is a member of the American Society for Testing Materials and the American Society for Metals.

♦ ♦ ♦

Victor A. Stibolt has been appointed assistant to the president of French & Hecht Inc., metal wheel manufacturer, Davenport, Iowa, and Springfield, O.

Victor A. Stibolt

Since completing his engineering studies at Cornell university in 1911, Mr. Stibolt has been identified with both the farm implement and the lumber industries. Among his accomplishments with the Moline Plow Co. were the erection of the Moline warehouse and the designing of the original Universal tractor plant, now the property of the International Harvester Co. He likewise remodeled the Poughkeepsie, N. Y., harvester plant in 1914-15.

From 1926 to 1932, Mr. Stibolt served as executive vice president of the Rock Island Plow Co., Rock Island, Ill. During the past three

years he has been connected with the Southern Pine association, and during the regime of NRA, was a member of the control committee of the Southern Pine association, the administrative agency of the lumber code in the southern region.

♦ ♦ ♦

George Burrus Jr. has been appointed junior metallurgist of the Spicer Mfg. Corp., Pottstown, Pa.

♦ ♦ ♦

Wade W. Erdman has been appointed manager of sales of dolomite and limestone products for the J. E. Baker Co., York, Pa.

♦ ♦ ♦

George R. Woods, 17 Battery Place, New York, has been appointed American representative for Ingemieursbureau Lemet Chromium, Hiversum, Holland, to handle its chrome hardening processes and patents in this country.

♦ ♦ ♦

Graham Rohrer, with the title of acting advertising supervisor, has been appointed to succeed Chester Gibbons as advertising manager of the Baldwin-Southwark Corp. Mr. Gibbons has been promoted to the position of assistant sales manager.

♦ ♦ ♦

James S. Duncan has been appointed general manager of the Massey-Harris Co., Toronto, Ont., succeeding B. W. Burtsell, who has retired due to ill health. Mr. Burtsell remains on the board of directors and continues to hold the position of vice president.

♦ ♦ ♦

Carl Buck has been appointed manager of stainless steel sales in the Philadelphia district for Peter A. Frasse & Co. Inc., 3717 Wissahickon avenue, that city. Mr. Buck comes directly from the general sales department of the American Sheet & Tin Plate Co., Pittsburgh, and in addition to sales has had several years mill and operating experience.

♦ ♦ ♦

I. W. Solomon, of I. W. Solomon Co., Pittsburgh, was re-elected president of the Pittsburgh chapter of the Institute of Scrap Iron and Steel Inc. at the annual meeting of the chapter Dec. 11. Joseph E. Jacobson, of Luria Bros. & Co. Inc., Pittsburgh, was elected vice president. Other officers elected include: Secretary, Richard Rosenberg, of Pennsylvania Iron & Steel Co., Pittsburgh; treasurer, Meyer W. Singer, of M. W. Singer & Co., Pittsburgh; chairman of executive committee, Edward L. Solomon, of Max Solomon Co., Pittsburgh.

♦ ♦ ♦

F. E. Fisher, well-known metallurgist and foundry adviser, is now associated with the Chicago and St. Louis sales offices of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala. For the past two years he

F. E. Fisher

has been metallurgist for the Western Foundry Co., Chicago, and prior to this he was foundry adviser for Bethlehem Steel Co. for nine years, covering the middle western and eastern states. His earlier training and experience in the foundry business was gained through connections with the Curtis Mfg. Co. and the Green Foundry Co., both of St. Louis. His headquarters will be at 333 North Michigan avenue, Chicago.

♦ ♦ ♦

David C. Arthurs has been named president of the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., succeeding R. K. Weber, who has retired. Other changes in personnel are the appointment of L. G. Sever as executive vice president, H. H. Cust as vice president and secretary, G. C. Beishline as vice president and plant manager, and Owen Harvey as treasurer and assistant secretary. Stanley W. Butler was elected to succeed Mr. Weber on the board.

♦ ♦ ♦

Robert F. Sanner has been appointed superintendent of personnel at the Duquesne steelworks of Carnegie-Illinois Steel Corp., succeeding Ross L. Leffler, who recently was appointed manager of industrial relations for Carnegie-Illinois in the Pittsburgh district. Mr. Sanner's service with Carnegie Steel Co. began in June, 1926, in the electrical department. In December, 1927, he was appointed assistant electrical engineer, and has held the position of assistant chief maintenance engineer also at Duquesne works since September, 1932.

Jesse J. Booth, formerly superintendent of the electrical department of the Gary, Ind., works of National Tube Co., has been appointed assistant chief maintenance engineer at the Duquesne works. He was graduated from the University of Missouri in 1910, and in 1911 became identified with Westinghouse Electric & Mfg. Co., at East Pittsburgh, Pa. In 1913, he went with the electrical engineering department of the Edgar Thomson works of Carnegie Steel Co., and in 1924 became assistant superintendent of the electrical department in the Gary works of National Tube Co. Mr. Booth was president of the Association of Iron and Steel Electrical Engineers in 1931-1932, and has held other important committee posts in this society.

♦ ♦ ♦

Waldo C. Portz, formerly blast furnace superintendent of the Perry Furnace Co., Erie, Pa., a division of Interlake Iron Corp., Chicago, has been made plant manager at Erie, succeeding the late A. R. Longnecker.

John R. Conklin, recently coke oven superintendent, has been named general superintendent over the blast furnace and coke oven divisions.

♦ ♦ ♦

L. S. Morse, executive engineer, York Ice Machinery Corp., York, Pa., has been elected president of the American Society of Refrigerating Engineers. Mr. Morse received his technical education at the Massachusetts Insitute of Technology, and has been associated with the York organization continuously for the past 40 years as chief draftsman, chief engineer, and executive engineer.

He became a member of the society in 1909, and is also a member of the American Society of Mechanical Engineers.

♦ ♦ ♦

W. W. Deal, local district manager of the American Steel & Wire Co., Cleveland, has been appointed president of the Steel Club of Philadelphia; H. E. Richardson, district sales manager of the Youngstown Steel & Tube Co., Youngstown, O., vice president; and F. L. Shants, district sales manager of the Lukens Steel Co., Coatesville, Pa., re-elected secretary and treasurer.

L. L. Caskey, assistant district manager of Republic Steel Corp., Youngstown, O., and H. H. Ziesing, manager of sales, Midvale Co., Nicetown, Pa., were elected directors. These, along with the officers, comprise the board of governors.

♦ ♦ ♦

Lewis M. Lind, Cleveland, has been appointed acting chief, machinery division, bureau of foreign and domestic commerce, Washington, succeeding R. E. W. Harrison, who has resigned. Mr. Lind assisted in the administration of machinery codes when NRA was in effect. He formerly was associated with the foreign trade department of the Cleveland chamber of commerce, the Malleable Iron Research institute, and the Lake City Malleable Co.

Enamel Company Laboratory Is Striking Symphony of Light and Color

BY W. G. GUDE
Associate Editor, STEEL

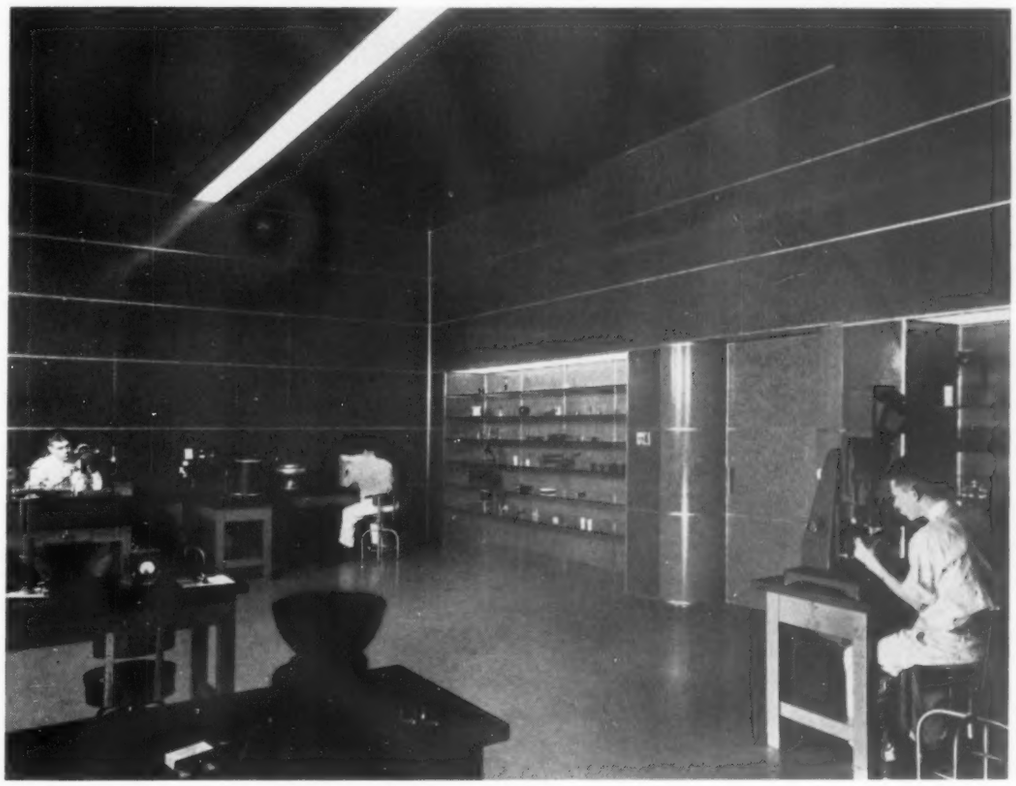
COMBINING efficiency with beauty, the Chicago Vitreous Enamel Product Co., Cicero, Ill., has just completed as an addition to its plant what is regarded as the most interesting laboratory of its type ever designed. While planned primarily for conducting research and developing new porcelain enamels, the laboratory offered the opportunity to introduce a new and practical method for utilizing the unusual finishes and variety of colors of porcelain enamel. The result is an appearance rarely associated with an industrial structure.

The main divisions of the laboratory, occupying about 10,000 square feet, comprise a main laboratory room, analytical chemical laboratory, office of the director of research, color and frit control laboratory, physical instrument room, experimental smelting department, smelt record room and shower and locker rooms. The laboratory is completely air-conditioned. More than 12,700 square feet of porcelain enamel has been used in finishing the walls, light fixtures, columns, shower and toilet stalls, furniture and, in two of the rooms, the ceilings. Most of the interior finish consists of a special acid-resisting "satin matt" porcelain enamel, developed for architectural purposes.

Complete equipment is located in the analytical chemical laboratory for testing and checking the raw materials used in the plant for the manufacture of porcelain enamels. A feature of this room is a recessed compartment of three divisions which contain blast lamps, electric and gas burners, hot plates, water baths and other apparatus. This compartment is lined with acid-resisting porcelain enamel, and the fumes from the operations are carried away through a hood and vent of the same material. Walls of the room also are completely lined with acid-resisting porcelain enamel, pastel green being used for the lower 10 feet while the remainder of the walls and the ceiling are ivory colored.

From an architectural standpoint, this room presents an interesting study. There are five recessed windows with porcelain enameled ivory reveals and ivory colored venetian blinds. The pastel green wall panels are trimmed with satin-finish stainless steel strips, all running vertically. These lines are emphasized by the use of lumiline lamps, also installed vertically. The room was designed to be free from horizontal lines which might offer the possibility of dust or dirt collection, making it an example of a logical type of construction for the food, dairy and brewing industries or for any other installation where cleanliness and sanitation are of prime consideration.

For preparing new enamels a large experimental smelting department has been provided. This room contains three smelters with a ca-



PHYSICAL instrument room, or "dark room." Subdued wall treatment and lighting are appropriate to the work done here

Corner of the color and frit control laboratory. Aluminum leaf ceiling and peach colored enameled walls aid visual inspection work

pacity of from 50 to 75 pounds, depending upon the type of enamel being developed, and two larger smelters with 150 pound capacity. Experimental smelts of enamel are started in the small smelters and, if found satisfactory, are transferred to the larger units. Smelts later are made in a 900-pound smelter to make sure the new enamel will be adaptable for production in the regular commercial smelters of this company, which are claimed the largest in existence.

Tests of these new enamels are conducted in the main laboratory room. This room, containing 5000 square feet of floor space, contains what is virtually three miniature porcelain enameling plants. One is devoted to the testing of enamel smelts; another is used for color matching purposes, while the third is devoted to general enamel development and research. Certain physical tests also are performed in this section of the laboratory.

The room itself is of striking appearance. Walls are finished with horizontal porcelain enamel panels but the conventional color scheme is reversed in that the light blue used at the base is topped by progressively darker shades, interspersed with a trim of stainless steel. An illuminated frieze, 3½ feet high,

Main laboratory room, 50 by 100 feet, housing three miniature enameling plants. Indirect lighting of the frieze and columns, and horizontal porcelain enameled panels in graduated shades of blue present unusual appearance

Part of the office of B. T. Sweely, research director. Walls are "velvet matt" egg plant colored porcelain enamel. Ceiling is green and bone white. Tops of desk, filing cabinet and table are green enamel. Window opens onto the color and frit control laboratory

starts 10 feet from the floor and demonstrates the effectiveness of porcelain enamel under indirect lighting. The illusion of perspective created by the frieze has the effect of a row of arches.

Lally columns in this room have been transformed into decorative pillars which serve also as complete lighting fixtures by means of a series of seven porcelain enameled drums, trimmed with stainless steel and blending with the wall colors. These taper from the floor to the ceiling. At the top of the columns are four large circular and conical disks, which distribute the indirect light so as to eliminate shadows at the column base. Porcelain enameled reflectors are recessed into the pink ceiling. Three of these have been made into beam lights by means of parabolic mirrors and spill rings, providing a concentrated beam over a small area for inspection and other purposes where strong light is needed.

The color and frit control room, adjoining the main laboratory room, is 18 feet square and is devoted to the inspection of samples from the

(*Please turn to Page 79*)

EDITORIAL

Direction by "Infinite Number of Individual Judgments"

> "Economic and social progress has made the greatest advance where enterprise has been directed by an infinite number of individual judgments and decisions, thus utilizing the skill, intelligence and knowledge of the whole people. No small group of men can possess the wisdom, foresight and discernment required to plan, direct and stimulate successfully the activities of all the people, nor will planning by political agencies be free from influences and motives unrelated to the question before them."

THE foregoing quotation, taken from the declaration of principles adopted at the recent annual meeting of the National Association of Manufacturers, raises an interesting point. Undoubtedly it was written for the purpose of emphasizing the fact that the individualistic system, under which this nation has developed to its present status, is preferable to the "planned economy" attempted by the present government administration.

History yields abundant evident to support this principle. Thoughtful observers will agree with the conclusion vouchsafed by the *New York Times* that "the errors of private enterprise pale into insignificance beside those of 'national planning'." Many will go further and will assert that any private enterprise which makes as many mistakes as are normally made in politically-guided activities cannot long keep ahead of the sheriff.

Is Strong Centralized Authority Good for Self-government of Industrial Groups?

But we are wondering if the principle of direction by an "infinite number of individual judgments" does not apply to industrial groups as appropriately as it does to nations. In other words, will an industry progress more rapidly and satisfactorily through the individual effort of its member companies or through the guidance of an industrial dictator or an exceedingly powerful trade association?

The question is timely because at the moment many industrial groups still are in process of perfecting policies and organizations in lieu of code set-ups. Some executives favor strong central authority. They advocate that their industries set up a czar, like Kennesaw Mountain Landis or Will Hays, whose decisions will be law. Their thought is that such a figure, given absolute authority, can function as a policeman to keep the industry's house in order.

Other executives lean strongly to individualistic ideals, of which Henry Ford probably is the outstanding exponent. They, like he, are the "lone wolves" of industry. They resent regimentation, whether it be at the hands of government or of the industry itself. They seek as much freedom as possible to do things in their own way.

Between the two extremes is a middle ground which probably provides the answer to many of the pressing problems of industrial self-government. Every industrial executive and every trade association manager should be interested in solving this problem. It is a vital question in many branches of the iron, steel and metalworking industries.

Organization for Co-operative Effort Should Permit Latitude for Individual Initiative

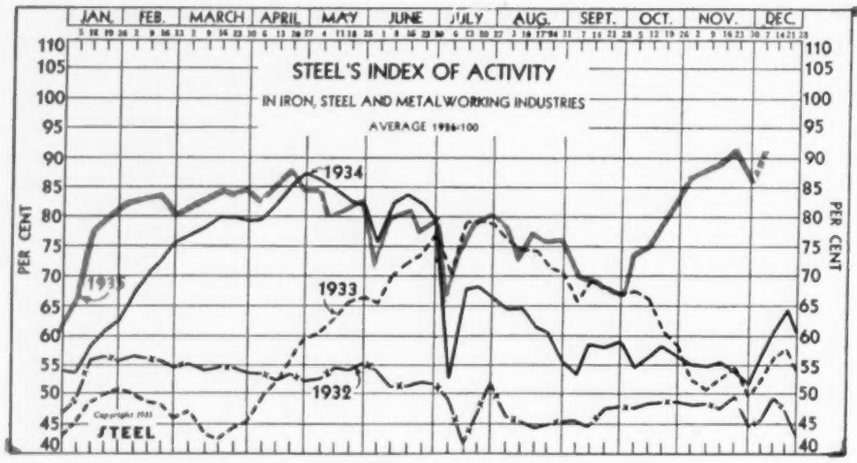
The unfortunate truth is that a general answer or solution, applicable to every industrial group, cannot be stated dogmatically. The requirements for each industry are not identical. A strong dictatorial policy which might prove advantageous to a group in which all companies were of approximately the same size and influence would prove to be impracticable in an industry in which several powerful, dominating companies are associated with numerous smaller, uninfluential units. The type of organization and the extent of delegated central authority must be tailored to fit each specific requirement.

However, certain generalizations may be offered. As far as possible, opportunity should be given for the development and exercise of initiative by individual units. The functions of the central organization should be limited strictly to those activities in which co-operative effort is distinctly more effective than individual activity.

If a trade association will cling tenaciously to this one principle, it will avoid many pitfalls. It permits a wide latitude for direction by "an infinite number of individual judgments" and avoids the dangers which arise when compromises from too many individualists result in a weak co-operative action.

Why is it that the consensus of opinion of 100 alert minds always seems impotent when compared with the individual statements of the collaborators?

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries increased 5.4 points to* 91.4 *in the week ending Dec.* 7:

Week ending	1935	1934	1933	1932
Sept. 21	69.4	58.1	68.2	48.0
Sept. 28	68.5	59.3	66.9	47.7
Oct. 5	73.3	54.7	67.4	48.4
Oct. 12	74.9	56.4	66.0	48.7
Oct. 10	77.4	58.2	60.9	58.7
Oct. 26	82.4	56.3	58.0	48.3
Nov. 2	86.4	55.0	52.3	48.5
Nov. 9	88.4	54.9	50.7	47.7
Nov. 16	88.8	55.2	52.6	49.2
Nov. 23	90.9	54.4	55.4	44.5
Nov. 30	86.0†	51.9	49.7	45.3
Dec. 7	91.4*	56.8	52.6	46.6

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). *Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings, power output and auto assemblies each* 20.

Rebound from Holiday Shows Vitality of Business

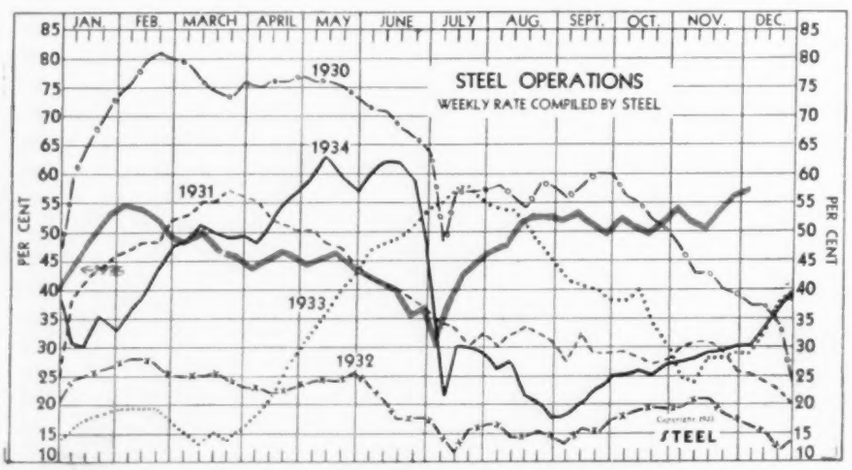
PERSONS who deal intimately with business indexes get into the habit watching the behavior of barometers in the week following a holiday or other interruption to activity. Very often, the extent and character of the rebound give important clues to the basic strength or weakness of the business structure.

STEEL's index of activity in the metalworking industries mounted from 86.0 in the week which included Thanksgiving day to 91.4 in the week ending Dec. 7. This gain of 5.4 points is the greatest recorded in any week following Thanksgiving day during the past seven years.

A study of the rebounds after Thanksgiving in these years shows that the degree of recovery in each case reflects with surprisinig fidelity the tone of business prevailing at the time. The rebounds in points are: 1929, 3.1; 1930, 2.3; 1931, 1.5; 1932, 0.8; 1933, 2.9; 1934, 4.9 and 1935, 5.4.

All factors contributed to the sharp rise in the index for the week ending Dec. 7. Steelworks operations, which did not recede in the previous week, gained a point. Car loadings and automobile assemblies regained almost all of their losses. Electric power output again did the remarkable by not only recovering all of the ground lost by the holiday interruption but also establishing a new all-time high. This latest achievement arouses the expectation that output may hit very close to the 2,000,000,000 mark in the week ending Dec. 28.

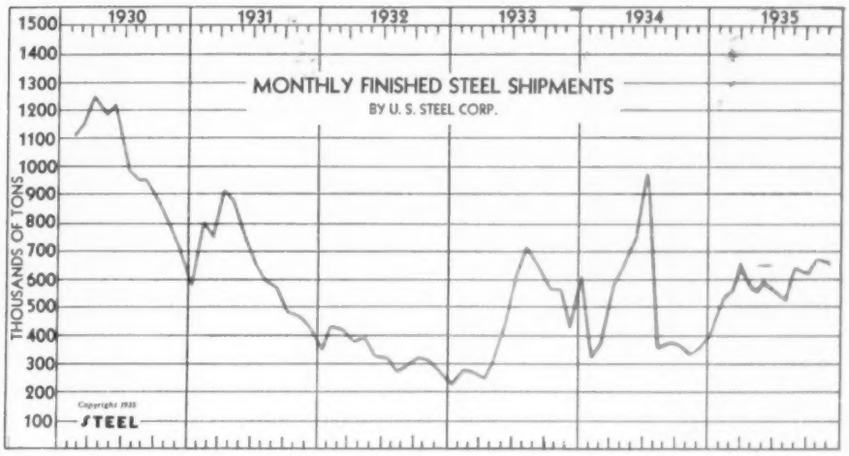
1935 Per Cent	
Dec. 7	57
Nov. 30	56
Nov. 23	54.5
Nov. 16	52
Nov. 9	53
Nov. 2	54.5
Oct. 26	52.5
Oct. 19	51
Oct. 12	52
Oct. 5	53.5
Sept. 28	51



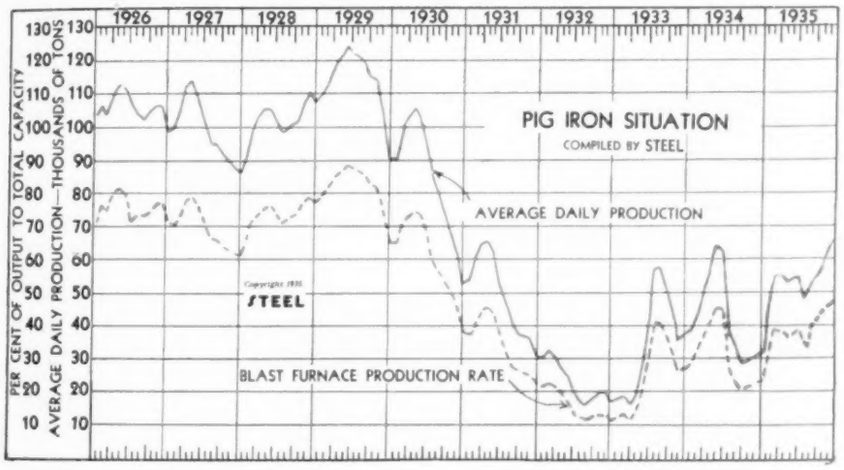
1934 Per Cent	
Dec. 8	30
Dec. 1	28
Nov. 24	29
Nov. 17	28
Nov. 10	27.5
Nov. 3	27
Oct. 27	25.5
Oct. 20	26.5
Oct. 13	25
Oct. 6	25
Sept. 29	25

Finished Steel Shipments Taper in November

	Gross Tons		
	1935	1934	1933
Jan.	534,055	331,777	285,138
Feb.	583,137	385,500	275,929
March	668,056	588,209	256,793
April	591,728	643,009	335,321
May	598,915	745,063	455,302
June	578,108	985,337	603,937
July	547,794	369,938	701,322
Aug.	624,497	378,023	668,155
Sept.	614,933	370,306	575,161
Oct.	686,741	343,962	572,897
Nov.	681,820	366,119	430,358
Dec.	.....	418,630	600,639



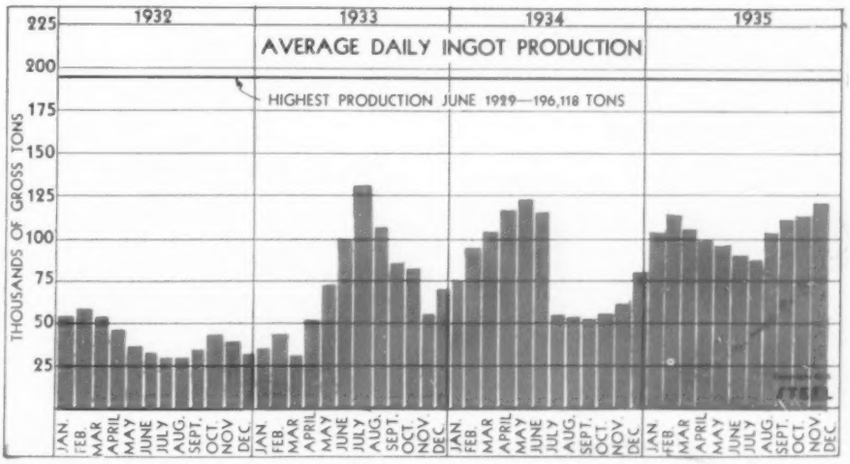
Iron Output and Furnace Rate Up Sharply



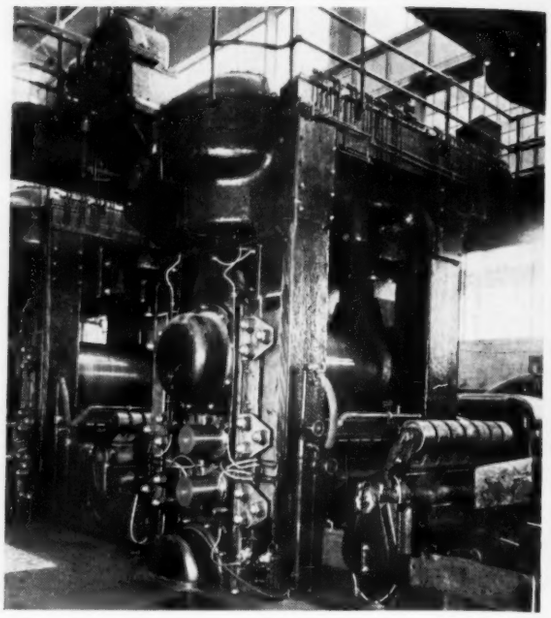
	Daily Average		Blast Furnace Rate	
	1935	1934	1935	1934
Jan.	47,692	39,537	34.2	28.3
Feb.	57,675	45,385	41.4	32.5
Mar.	57,120	52,438	41.0	37.5
April	55,719	57,873	40.0	41.4
May	55,986	66,370	40.2	47.5
June	51,949	64,563	37.2	46.3
July	49,043	39,630	35.2	28.4
Aug.	56,767	34,199	40.7	24.5
Sept.	59,009	29,969	42.5	21.5
Oct.	63,818	30,689	45.8	22.1
Nov.	68,876	31,930	49.5	28.3
Dec.	.....	33,161	.....	23.7

November Ingot Output Continues Gain

	Gross Tons		
	1935	1934	1933
Jan.	106,353	73,968	39,110
Feb.	115,740	92,164	44,709
March	110,313	103,646	33,268
April	101,558	117,443	53,817
May	97,624	125,907	73,201
June	89,236	117,672	98,632
July	87,316	59,578	126,734
Aug.	108,123	51,161	106,058
Sept.	113,193	50,759	87,811
Oct.	116,535	54,885	80,188
Nov.	121,279	61,947	58,507
Dec.	.....	78,570	71,944



Modern Wide Strip Mill at Ford Plant Has Many New Features



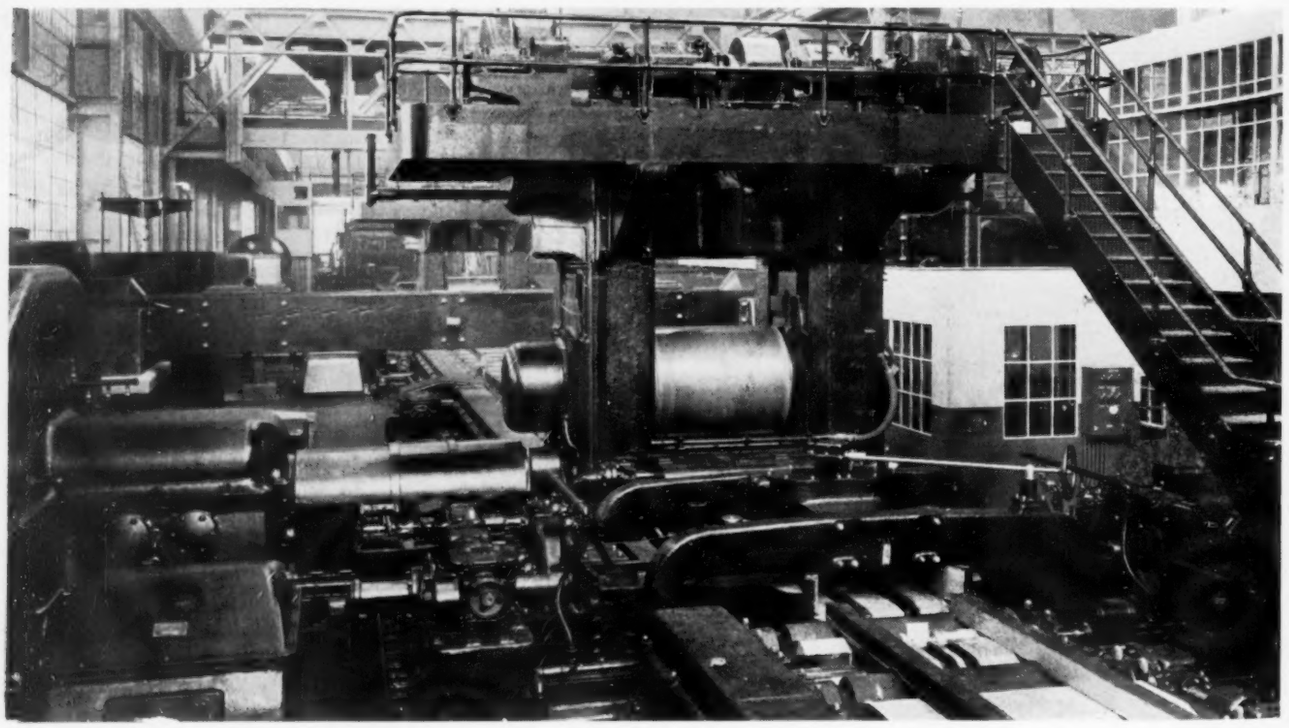
No. 4 finishing stand showing looper on delivery side

ANOTHER important addition has just been made to the steel plant of the Ford Motor Co., Dearborn, Mich. This time it is a continuous broad strip mill — one that is in keeping with Ford ideas. Nothing has been spared to make it one of the most modern strip mills of its kind in this country. Construction details are interwoven with many new features, as will be apparent from the description which follows. While the completion of the new mill is an important factor from the standpoint of strip production yet of equal importance is the fact that by far the largest part of the tonnage produced will be finished in coil form.

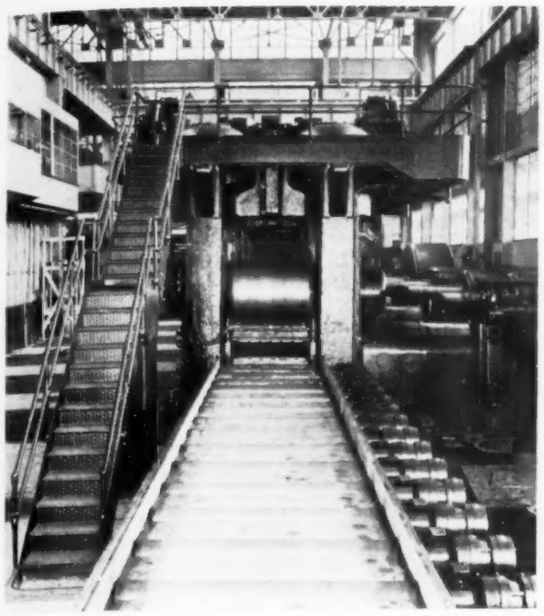
The full significance of this practice is comprehended from a comparison of the methods employed in the Ford plant for stamping fender blanks using a single sheet and coiled strip. Presses working single sheets require two men for feeding the stock between the dies, two men for removing the scrap on one side and two men for removing the fender blank on the other side — six men in all for the production of one fender blank.

With a coil of strip mounted on the charging side and fed between the dies intermittently, however, two fender blanks are produced with only four men. Not only is an additional blank obtained with a fewer number of men required to perform the operation when the presses are fed with strip in coil form but less scrap is produced, shearing costs are greatly reduced and transportation costs are curtailed sharply.

Little wonder, therefore, that



One of the two 4-high roughing mills showing an underdriven vertical edger in foreground



Delivery side of last stand in the finishing mill train

presses throughout the Ford plant wherever possible are being equipped to handle strip in coil form rather than single sheets as now used.

The new mill, which will have sufficient capacity to finish all the sheets required under a production schedule of 3000 cars per day, is now practically ready for operaton. In fact, certain sections are now being used. The hot strip mill is designed for the production of strip in gages as light as No. 18 and in widths up to 48 inches. The cold mill is designed for gages from Nos. 15 to 25 and widths up to 78 inches.

The general arrangement of the Ford 56-inch hot strip mill consists of the following major units:

Blooming mill, 44-inch.

Slab shear (1000-ton) and gaging table.

2-High scale breaker, 24 x 56-inch.

2-High broadside mill, 42 x 96-inch.

Vertical edger.

2-High roughing mill, 32 x 56-inch.

Vertical edger.

4-High roughing mill, 21 and 46 x 56-inch.

Vertical edger.

4-High roughing mill, 21 and 46 x 56-inch.

Cooling table, 175-foot.

2-High scale breaker, 24 x 56-inch.

4-High finishing mill (5 stands), 21 and 46 x 56-inch.

Hot runout table, 300-feet.

Hot coilers (2).

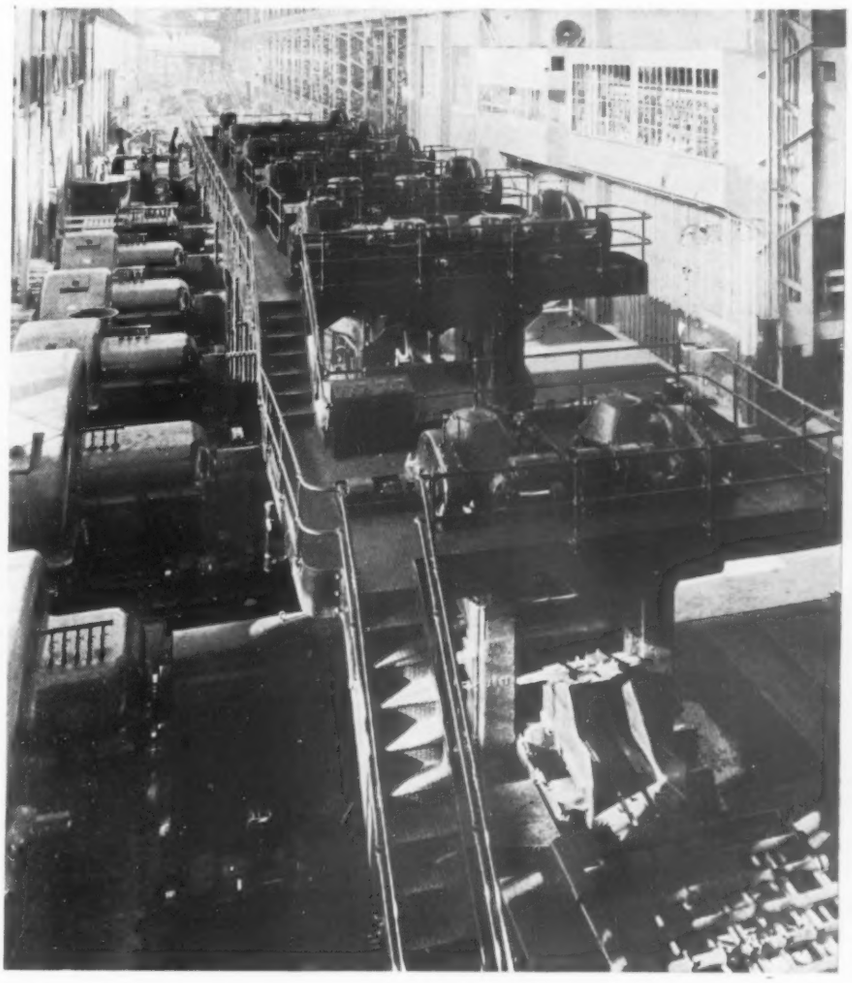
Flying shears.

Piler.

When finished, it is believed this will be the most modern mill ever installed, embodying in its design and construction every proven device for the control of metal from the time it is delivered as an ingot to the soaking pit until it leaves the mill as a finished product. It will be equipped generally with antifriction bearings, the major exceptions being on the blooming mill and the first three roughing stands. Tapered roller bearings are installed on the work and backup roll necks of all mills, as well as on the screwdowns, drives, tables, reels, uncoilers, shears and other auxiliary equipment. Approximately 1400 of these bearings ranging in weight from nearly 4 tons apiece down to about 1 pound and totaling approximately 185 tons, will be installed.

The 44-inch blooming mill is in the same line as the existing 42 x 32-inch continuous blooming mill. In addition to burnishing slabs to the new hot strip mill, this mill also may be used to furnish large blooms to the old blooming mill, replacing the small ingots now used for reduction to billets for the bar mills. The new blooming mill is a 2-high reversing unit with 38 x 96-inch rolls. The screwdown on this mill is of the enclosed type, driven by two motors through a double helical gear drive and worm gears, using a magnetic clutch. Inertia of all moving parts has been held to a minimum to assure maximum acceleration and reduction of time required to set the rolls for the edging passes.

A specially-designed overhead double rack type electrically operated manipulator is provided at the bloom-



View of the six stand 4-high finishing train looking toward rear of mill building

ing mill with fingers mounted on one side guard on the entry side of the mill for turning over and setting up the slabs for edging. Sideguards and tilting fingers are operated by separate gear drives, all drives being mounted on the foundation on the drive side of the mill, entirely clear of the tables. Mill scale is removed by a pan-type chain conveyor.

Both front and back blooming mill approach tables are each driven by two enclosed-type double helical gear drives using 100 horsepower motors. These drives are so located that the shock load on the line shaft is distributed evenly over its entire length. All table rollers and the line shaft are mounted on roller bearings, and the gearing is of forged steel with heat-treated cut teeth.

From the blooming mill the slab advances to a 1000-ton shear over roller tables equipped with motor operated side guards for squaring the slab for cutting. The shear can handle 6 x 49-inch hot slabs, the throwout clutch being motor operated. The gage head is motor traversed and is fitted with a self-relieving device which moves the gage head away from the cut piece on lifting. Special equipment is provided at the shear to remove crop ends from the table and deliver them directly to open-hearth charging boxes.

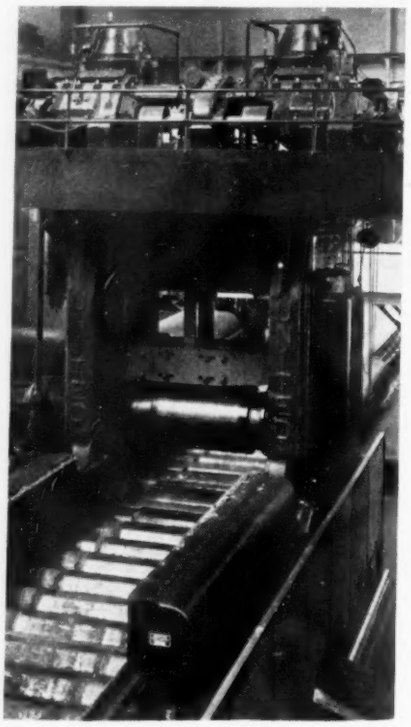
Disposition Is Two-Fold

After shearing, cut slabs advance to the skid transfer for direct rolling, to the slab furnaces for reheating, or are carried down the furnace approach table to the piler for storage as desired. The slab transfer unit is of the reversing type and is installed in front of the reheating furnaces to take slabs from either the blooming mill or reheating furnace line and transfer them to the hot strip mill line. It also may be used for temporary storage of slabs which may be returned to the blooming mill line as required.

At present, only two slab reheating furnaces are installed, although provision has been made for a third unit. One of these furnaces is equipped with a tile recuperator and the other has a carborundum tubular type recuperator.

On entering the roughing train, the slabs first pass through a 2-high 24 x 56-inch scale breaker where they are given a comparatively light reduction to break up the primary scale into particles which can be removed easily by high-pressure water jets. The next stand in line is the 2-high 42 x 96-inch broadside mill. In this stand the slab may pass straight through with the necessary reduction, or a 7½-foot slab may be turned through a 90-degree angle on a turntable and sent through the stand broadside for spreading to the desired width. A turntable on the delivery side turns the spread slab back to its original direction for succeeding passes. Entry and delivery tables are equipped with motor-operated sideguards for squaring up the slab and a pusher is provided on the entry table to make positive the entrance of the slab into the rolls.

Next in line is a 2-high 32 x 56-inch roughing stand, followed by two 4-high 21 and 46 x 56-inch stands in which the slab is reduced to a thickness ranging from ¾ to ½-inch depending upon the gage required in the finished strip. Each of these last three stands is preceded by an underdriven vertical edger



Delivery side of 44-inch blooming mill which is driven by a 7000-horsepower motor

which controls the width of the strip and gives the required rolling effect on the edges. The roughing stands are spaced at such intervals that a slab is never in more than a single stand at any time.

Strip leaves the last roughing stand at a speed of approximately 420 feet per minute, and is entered into the finishing train scale breaker at about 150 feet per minute. This makes it essential that the strips be entirely clear of the roughing train before finishing begins. This necessity has been turned to advantage in the design of the mill.

The major factor in gage variation in modern roller bearing equipped mills is the change in temperature between the front and back of the strip as it passes through the finishing train. To correct this and at the same time increase the production of the mill, a high-velocity air cooling system has been installed in connection with the table between the roughing and finishing trains.

This air table is built in sections, special nozzles for the air jets being installed above and below the table for a distance of approximately 100 feet. Provision is made for the easy removal of the top structure when repairs are made on the table. As the strip advances toward the finishing train, these air jets are opened automatically in sequence, the length of time being controlled by present time relays. Ordinarily, a difference in temperature of as much as 150 degrees Fahr. might exist between the front and back end of a strip entering the finishing train, but under the new automatically controlled air cooling system all points of the strip will be at the same temperature as they enter the finishing train. A constant check on temperature is kept by means of a high-speed pyrometer located near the entrance to the finishing train. The table is sufficiently long that there will be no delay in handling even the heaviest material rolled, the strip advancing constantly.

Particular attention has been given to scale removal in the design of this mill. A mechanical scale breaker precedes both the roughing and finishing trains so that the high-pressure water jets can remove all primary scale effectively. Secondary scale formed during the passage of the slab through the roughing stands is removed on the entry side of each stand by water sprays under 1000 pounds per square inch pressure.

Size of Bearings Used

The finishing train, which is equipped completely with tapered roller bearings, comprises a 2-high 24 x 56-inch scale breaker and five 4-high 21 and 46 x 56-inch roll stands, and the necessary motor-operated sideguards, entry and delivery guides and uploopers. These hot mills are designed to operate with a maximum separating force of 3,000,000 pounds at a maximum speed of 1500 revolutions per minute, with an expected life of 15,000 mill operating hours for the bearings. Backup roll neck bearing will be 25½ x 40½ x 22¼ inches and work roll neck bearings 13½ x 10 inches.

These bearings are supplied with ground cup and cone spacers to give a preadjusted setting. The bearings are assembled with the outer filler rings located between the bearing and the outer closure and the entire unit locked in place by a split inner ring and threaded outer ring. This differs from other designs in that the inner filler ring is shrunk on the neck and remains fixed permanently instead of being loose and keyed in

position. Consequently, the chock was designed with an extended inner portion which is close to the inner race of the bearing, giving practically a sealed assembly when the bearing and chock are removed from the neck. Likewise, special closure provision has been made.

Between the last two stands of the finishing train is installed a specially designed device to automatically control the tension of the strip at this point, permitting maximum precision to be attained in the last stand. This device operates as a controlled uplooper, tension being maintained constant over a wide range of sizes.

Strip leaves the finishing train at a speed of approximately 1500 feet per minute, advancing over the runout table about 300 feet to either of two hot coilers or the flying shear. Rollers on this table are individually motor driven and mounted on antifriction bearings. The hot coilers discharge to an overhead conveyor system which takes the tight coils to the pickling department for further processing.

Crop Control Is Automatic

The flying shear is fully equipped with antifriction bearings and is of the drum type, designed to operate at speeds up to 2000 feet per minute. Crop control is secured automatically by speeding up the shear drums from a stopped position, the drums being coupled magnetically to the main motor and pinch roll drives at the proper time as determined by tachometers geared to the two separate components of the drive system.

Cut lengths from the flying shear are taken by a depressing type piler. After weighing, this material may be transferred to a conveyor which takes it to the pickling department, or to piles which are picked up by overhead crane and taken to storage. Provision has been made for the installation at some future date of a double hot bed about 250 feet long in connection with the individually motor-driven hot run table.

A special gravity section has been provided at the end of the overhead conveyor which brings the coils to the pickling department. Here a stop has been provided so that coils may be raised to position in storing by means of a rectangular magnet, or transferred to a second conveyor which carries the coils to the entry end of the pickling line where they are placed directly in the processing uncoiler.

Here the ends are sheared and coils stitched together for continuous pickling. Two lines of pickling tanks are installed, with provision for a third line. These tanks are 300 feet long and will handle strip up to 78 inches wide. They are made of steel and are rubber lined, with an insulating shell of acid-resisting brick. Special provision has been made in this department for the removal of fumes and for neat, clean operation. As the strip comes out of the pickle tank, it is washed first in cold and then in hot water, passing through a dryer and set of pinch rolls to the shears where stitches are removed before further processing.

Pickled strip either may be recoiled for transfer to the welding line or handled flat by special equipment at the end of one of the pickling lines. The welding line has been installed to build up hot rolled and pickled coils to a predetermined length so as to eliminate scrap losses and to increase the efficiency of the cold reducing mills. The cut ends are held in positive alignment during welding by specially designed equipment to secure perfect joints and smooth uniform coils. The flat strip equipment consists of an upcut shear, table and gager, and is arranged to cut sheets from 5 to 30 feet long from strip of all sizes up to the maximum width handled in the pickle tanks. Cut lengths pass through a pair of pinch rolls to a depressing-type piler. The piles advance from the end of the piler to a scale table, from which they are removed by an overhead crane for further finishing operations.

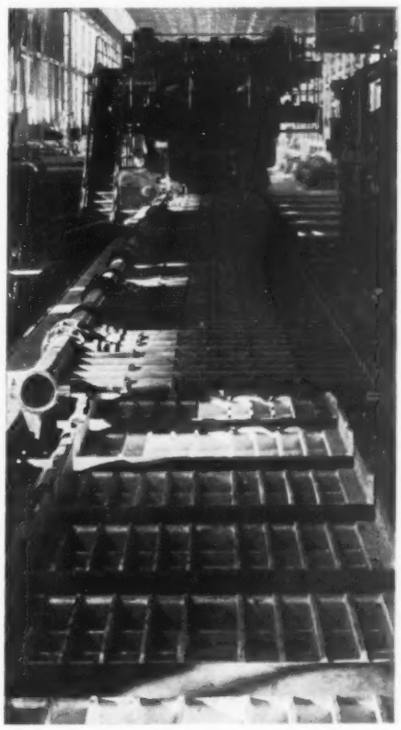


Table connecting roughing and finishing mills is equipped with air cooling systems

The cold rolling division of the new Ford mill is designed and equipped to handle strip in wider widths than can be produced in the hot mill, wide material being purchased on the open market. This division consists primarily of a 56-inch wide 3-stand tandem mill, and 84-inch reversing mill and two stands of skin pass mills 56 inches wide.

The 18 and 46 x 56-inch tandem mills are preceded by a magnetic type uncoiler with an automatic sticker for inserting the heavier class of material into the rolls. A roll type tension device is incorporated between the stands in this mill, and some back tension provided even on the first stand thus making possible close control at all times over the accuracy of gage of the strip being rolled.

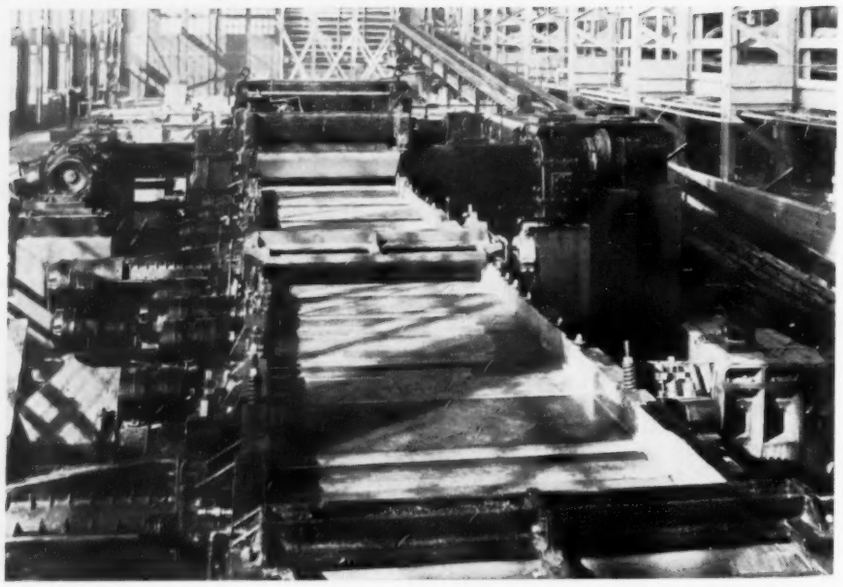
Every precaution is exercised to enable close and accurate gage control to be maintained on all mills. Cooling and contour control is secured by flooding the cold mill rolls with a specially prepared water soluble oil solution in a circulating system. This solution is sprayed on the rolls at high velocity, its temperature being maintained constant in the circulating system. Tension control plays an important part in strip production, and the fact that all roll necks in the cold mill are equipped with roller bearings is likewise of importance, as roll adjustment is accurate and need only be modified to compensate for roll wear.

Same Size Bearings Used

Backup roll necks in the 4-high tandem cold mills are mounted on the same size roller bearings as are used in the 4-high hot mill finishing stands, namely 25½ x 40½ x 22¼-inch, with 10¼ x 14¾ x 10-inch bearings installed on the work roll necks. These mills are designed to a separating force of 2,750,000 pounds at 500 feet per minute under an expected life of 15,000 mill operating hours for the bearings.

Strip of wider width than that furnished by the hot mill will be finished in a 4-high reversing cold mill 20½ and 56 x 84 inches. The roller bearings in this mill are designed to give an operating life of 15,000 hours continuous service under a separating force of 4,500,000 pounds at 350 revolutions per minute, the backup roll neck bearings being 30 x 47 x 32 inches and the work roll bearings being 12 x 17¼ x 11 inches. An uncoiler and sticker of the same type used on the tandem cold mills precedes this reversing cold mill. Tension reels are provided on both sides of the mill, some tension being applied to the strip on the first pass, and provision made to hold a uniform tension on the strip as it goes back and forth through the mill.

Two tempering or skin pass mills are installed adjacent to the cold reversing mill. These are 2-high units 27½ x 56 inches and are equipped



Two coiling machines are located beneath table in foreground; flying shear is shown in distance

with standard type uncoilers and tension reels on the delivery side. These mills are designed to handle strip up to 50 inches wide, as the production of 78-inch strip is sufficiently small that the single cold reversing mill can be used as a tempering mill by merely changing the rolls.

An innovation in strip heat treating practice is represented by the continuous electric heat treating furnace 48 inches wide and 227 feet long. This furnace is under automatic temperature control at all times, the furnace being designed to function in sections, each operating under automatic temperature control. Experimental work has demonstrated that this type of furnace is highly efficient in keeping inventory low and that the product is more uniform and is adaptable for use in presses for all parts, with the exception of those requiring exceptionally deep drawing.

How Strip Is Treated

At the entry end of this special furnace, uncoiling, leveling and stitching equipment is provided. On leaving the furnace, the strip passes through a stand of pinch rolls to an upcut shear where the stitches are removed before recoiling for delivery to the skin pass mills. Material to be used in deep drawing operations is annealed in special electrically-heated coil annealers, each unit being large enough to hold two coils of the maximum size used in the drawing operations. These coils are also skin passed after annealing, narrow strip being handled by the tempering mills and wide strip in the cold reversing mill.

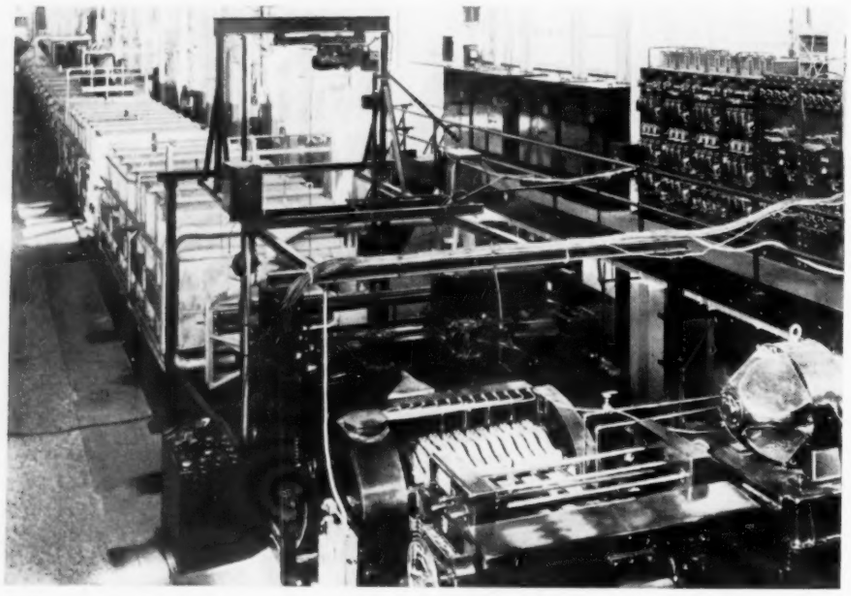
After being skin passed, material enters a section of driven cradle rolls. These rolls, which are all mounted on tapered roller bearings, are of the reversing type so that material can be sent to either the flying shear line or transferred to a chain type conveyor which delivers the material to the press room.

The cold flying shear installed in the Ford mill is a specially designed differential drive unit. It will cut strip of all sizes used in the plant into lengths from 3½ to 21 feet in 1/16 to ⅛-inch steps, accurate to within 1/64-inch. The line includes the latest type uncoiling, leveling and piling equipment, terminating at the scale platform from which the piles of sheets are removed for forming operations in other departments of the plant.

All roll assemblies in all stands in both the hot and cold mills are balanced hydraulically to assure nonslip operations at all times. Two independent roll balancing systems are installed on the hot mill, the control balance being so arranged that any single work or backup roll in any mill may be removed without affecting the pressure on any other roll in the mill. This arrangement greatly facilitates roll changing. Provision is made for the use of C-hooks for handling work rolls, and specially-designed buggies will be used in connection with the changing of backup roll assemblies. Hydraulic cylinders connected to the roll balance system raise the backup roll assembly in the mill, allowing it to be shifted to a set of skid rails on which the assembly may be pulled out of the mill on the operating side.

All stands in both the hot and cold mill, with the exception of the last stand of the 4-high hot strip mill are driven by combination gear and pinion type drives. The latest 4-high finishing stand has the motor direct connected to the pinion stand. The combination mounting not only makes possible a considerable saving in the floor space, which was at a premium in this plant, but also aids greatly in the rigidity of the units. The cases are of heavy construction, particular attention having been given to the external appearance, all corners and angles being rounded and all surfaces being smoothed before painting, the result being highly pleasing to the eye.

All mill and edger drives are fully enclosed and the shafts mounted on antifriction bearings. The gears are



Electric heat treating furnace, 48 inches wide and 227 feet long, for annealing coiled strip steel

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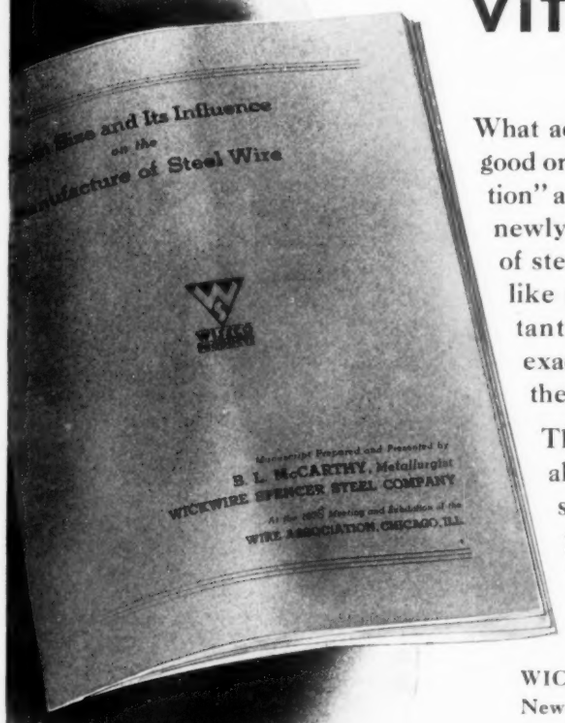

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precision cut with continuous herringbone teeth, hardened and ground. Bearings are of the two-row type consisting of a double outer race and two inner races butted together or separated by a cone spacer, all parts being ground to exact size so as to give the desired bearing set up. The bearings at both ends of the high-speed pinions are of the same size and are permitted to float. The same is true in connection with the lower mill pinions. Three different sizes of bearings are required on the drive gear shaft. The center bearing is fixed to locate the gear shaft and to take care of any mill thrust that may develop. The end bearings are permitted to float.

Housed in Single Room

All main motors are located in special motor rooms where they can be cared for properly, a single room housing all the hot mill motors. The blooming mill and hot strip mill lie parallel to each other, but operate in opposite directions. This has many advantages, among which are the economy of space and the opportunity for grouping all main drive motors and auxiliary electrical equipment in one room where they can be kept clean and efficiently maintained. Motor ventilation is supplied from an air pressure basement below the motor room.

The blooming mill motor is the largest in the hot mill motor room, being a 7000 horsepower, 50/120 revolutions per minute unit operating on 750-volt direct current. An 800-horsepower induction motor with a flywheel is installed to drive the scale breaker, and a 2500 horsepower slip ring induction motor with a flywheel is used in connection with the broadside mill. As the roughing stands are so spaced that the slab is out of one stand before it enters the next, constant-speed motors are used for driving these mills, effecting a substantial saving. 2500 horsepower synchronous motors drive the three roughing stands. All of the 2500 horsepower alternating-current motors draw power at 13,200 volts direct from the power station. The three vertical edgers are driven by direct-current adjustable - s p e e d (400/800 revolutions per minute) 230-volt motors, the first two being 600-horsepower units and third 150 horsepower.

As strip may be in all the finishing mills simultaneously, variable speed (200/400 revolutions per minute) direct-current motors with vernier adjustment are used. The scale breaker is driven by a 400-horsepower motor, the first four stands of the finishing mill by 3000-horsepower motors, and the last stand by a 2500-horsepower motor. Power is supplied at 500 volts to these motors by six 1500 kilowatt 275-volt motor-generator sets connected in pairs in series. The vertical edgers and mill auxiliary motors are supplied with power at 250 volts from six similar motor-generator sets.

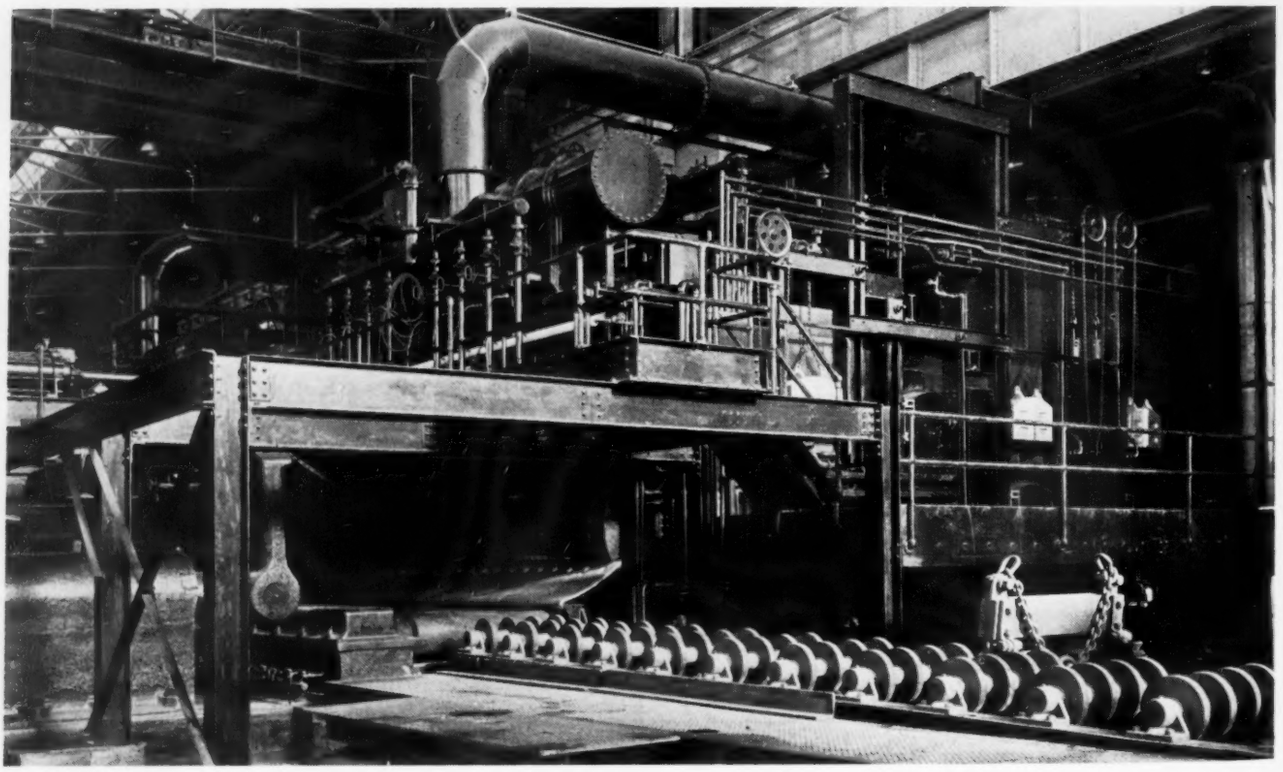
Just as the hot mill has its special motor room in which all main motors are housed under favorable conditions, so, too, is provision made in the cold mill for the main driving motors. In one room are the three 1500-horsepower 350/700 revolutions per minute variable-speed motors required by the tandem cold mills, and the 400-horsepower 300/1050 revolutions per minute motor which drives the reel. In a second room are the 2000-horsepower 300/500 revolutions motor for the cold reversing mill and the two 800-horsepower 225/787 revolutions per minute motors which operate the reels on either side of this mill.

Forced Ventilation Employed

Motor rooms are equipped with necessary switchboards, etc., and the motors are ventilated from pressure basements as in the hot mill motor room. The skin pass mills are each driven by 300-horsepower 450/800 revolutions per minute motors, their reels being powered by 100-horsepower 300/1200 revolutions per minute units. These motors are the only large units in the new mill that are not housed in motor rooms, but the location of the mills in relation to the balance of the equipment is such as to prevent special housing provisions for the motors. All motors in the cold mill draw power from a transformer substation.

Inasmuch as the entire mill was designed from beginning to end by the same organization making it possible to simplify and co-ordinate the mechanical and electrical layouts, so was it also possible to simplify the

(*Please turn to Page* 56)



One of the two gas-fired slab reheating furnaces of the gravity type. Provision is made for a third unit

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Your Plant Library

IT IS as necessary for the engineer who wants to keep up-to-date to read the trade paper of his industry as it is to read the newspaper to keep in step with what is going on in the world. Three sections of his trade paper are especially important.

Illustrations made from photographs taken in other plants often tell more than is given in the accompanying columns. For example, some time ago the plant engineer of a well-known automotive concern told a representative of STEEL that he used a large reading glass to magnify illustrations and pick out details of mounting drives, control equipment, lubricating devices and other "little things" which were indistinct in the reproduction. Many good ideas were obtained from smaller plants, he admitted, even though the automotive plants are considered to be the last word in plant equipment and installation.

What To Read and Why

"New Equipment" departments in trade papers are equally important, are widely read, and should be for progress.

"Trade Publications," the announcements of new catalogs and descriptive circulars issued by manufacturers, are also important, although they do not receive the consideration they should get. It is from this source that the progressive engineer builds up his reference library. Manufacturers are preparing better publications than in former years, not only better looking but containing more practical information on the use, installation, economies and advantages of the equipment rather than being simply descriptive. An excellent example is a handbook on variable speed transmission recently issued by one manufacturer. Many other informative catalogs are available at no cost for reference. Parts lists particularly need to be permanently filed.

In addition, the plant engineer should have some of the books published on his industry. The metals and metalworking industries are especially well covered by reliable authorities. Only a few books have been published on power transmission, lubrication, electrical control and allied subjects, but a well chosen assortment of these, together with the standard electrical and mechanical engineers handbooks, are almost indispensable for reference.

The cost of such a library is not excessive and will quickly repay its trouble and expense by aiding in the solution of even a few troublesome problems. Incidentally, it is the plant engineer's ability to solve these problems that keeps him on the job. His advancement depends upon himself and an inexpensive library is a simple and economical assurance of his future.

◆ ◆ ◆

Frosty Mornings

SPEED reducers in pits and in exposed or unheated locations get mighty cold these frosty mornings. One master mechanic stated recently that the speed reducers in pits driving some coal conveyors along Chicago's lake front were as much as 10 degrees colder than was registered on thermometers at the surface of the ground. This condition necessitates special attention to the lubricant.

At this plant, not only is the lubricant changed for winter and summer service but the conveyors are operated continuously during the coldest weather even though nothing is carried, simply to keep the conveyor bearings from "freezing" and the oil in the speed reducers from becoming so thick as to require heating before starting. As this plant has several miles of conveyors, heating the oil cases on the speed reducers would require a large force and considerable time.

When the thermometer drops to about 10 degrees above zero or lower the conveyors never stop; between 10 and 15 degrees they are not permitted to stand idle more than an hour. Above 20 degrees the conveyors regularly operate a sufficient portion of the time to prevent any trouble.

◆ ◆ ◆

Drive Judgment

SUCCESS or failure of a difficult belt drive often depends upon the drive judgment of the man engineering its selection and installation. For some of the more common drive operating conditions which decrease the efficiency of transmission, such as arc of contact less than 180 degrees, vertical drive with small pulley below, and high speed, formulas have been developed so that necessary allowances may be determined, at least theoretically, by calculation.

For certain other conditions, such as humidity, dust, fluctuating or jerky load, extra small pulley, gas engine drive and a few others, the engineer must decide on the basis of his experience and judgment how much extra load carrying capacity should be provided for satisfactory or practically trouble free operation. This additional factor of safety varies from 10 to 100 per cent, sometimes more, depending upon the severity and combination of conditions. Under some conditions, such as the use of composition pulleys, the drive can be credited about 10 per cent because of the increased pulling power.

Chains, flexible couplings, clutches, speed reducers and variable speed transmission units also require allowances or service factors for operating conditions. These conditions, however, have been somewhat more generally recognized and standardized than is the case with belt drives.

Before condemning any drive equipment be sure that it is engineered properly. Otherwise freedom from trouble cannot be expected.

◆ ◆ ◆

The most dependable safeguard for maintenance and transmission men is their own natural carefulness. Careless men seldom stick on these jobs.

◆ ◆ ◆

Where metallic belt fasteners are used, follow the manufacturer's recommendations as to size and type of fastener for the particular size of belt. Using one size of fastener for all belts is a common cause of belt trouble.

◆ ◆ ◆

Foundations usually settle, making it advisable to check new alignment on new installations within two months after installation and at least annually thereafter.

◆ ◆ ◆

A tin can suspended below a lineshaft hanger bearing indicates poor lubrication. The bearing or grooving may be at fault but usually a bottle type oiler will make the can unnecessary and save enough oil to pay for the oiler.

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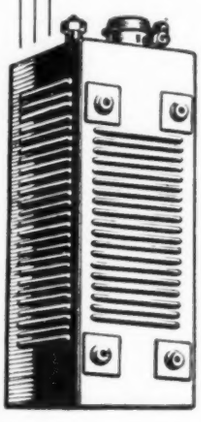
For belts of special tannage, rubber, canvas and special textiles use only the belt dressings recommended by the manufacturer of the belt.

STURDY—and STRONG

...because it's built of steel!



POUNDS saved are dollars saved. The Edison Storage Battery, all of whose structural parts are steel, can be handled by fewer men and adds the least weight to an industrial truck. That's economy. But the big economies in using steel batteries are these:

1. Men, materials and machinery are never "tied-up" due to battery failure when the trucks are powered by Edisons. Unlike all other motive power units for industrial trucks, Edison Batteries are not subject to sudden failures.

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These facts are published to remind men who know steel that the most satisfactory material of which to build a storage battery is steel. Do you know which industrial battery your company uses?

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DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, NEW JERSEY

Surface Treatment

Introducing a New Service For Finishing Departments

IT IS believed that a brief introductory discussion of the scope and purpose of this new department will be of interest to its readers. The leading Surface Treatment and Finishing embraces a broad field which for purposes of easier discussion may be divided into two general classifications—organic finishes and inorganic finishes. Each general class further subdivides into many smaller branches, each branch embracing one of the innumerable finishing materials now available to the consumer.

In general, organic finishing materials include paints, varnishes, lacquers, enamels and asphalt-type coatings. Inorganic finishes include metallic coatings, which may be applied by electroplating, hot dipping or one of the patented spraying processes of application. The inorganic field also includes the chemical treatment of surfaces and the comparatively recent development of ceramic finishes.

Since each of the many materials and methods of finishing has been developed to meet specific requirements of protection or adornment to the base metal, it is at once evident that a broad general knowledge of the available materials and methods of application is of utmost importance to the modern manufacturer, especially if he has a diversified and changing line of products.

THE purpose of this new department is to aid the consumer of finishing materials in selecting the finishes best suited to his particular needs and to keep him informed of new and interesting developments in the field of finishing. It cannot hope to deal with finish problems in sufficient detail to be of assistance to companies which maintain large research departments to investigate particular problems, but it can and will be of assistance to those who do not maintain a staff of highly trained chemists and engineers for this purpose.

Determine Finish Properties

New materials and processes can, of course, be reported only in a general way, with enough suggestions to indicate possible lines of application, except where experiment and trial have established definitely the results which may be expected and the limitations which may be imposed. In this respect, no consumer of finishing materials can hope to select these materials intelligently and efficiently without establishing a definite program of preliminary testing of the finishes which they produce to determine whether or not they meet his particular requirements. This department will suggest, from time to time, apparatus and procedures for establishing such a program for general use in determining such properties as: Wear resistance, impact resistance, flexibility and other general properties. Tests for special properties, of course, can be developed easily by the consumer, who knows just what special requirements he demands of a material.

The consumer of finishing materials is interested primarily in the performance of the finish produced by these materials. To most consumers, the chemical composition of these materials is merely a matter of academic interest, and in many cases the producer of finishing materials has reason to keep the chemical composition and methods of manufacture of his products a secret.

Since there is, as yet, no definite relationship between chemical composition of finishing materials and performance of the finish produced by these materials, the consumer must rely on the physical behavior of the finished product in arriving at a decision as to the material to be used. To amplify this statement, which may be open to academic criticism, it must be stated that there are so many products of slightly different chemical composition which provide finishes of relatively identical physical properties, that a program of research to establish such a relationship would involve an enormous expense. Such an expense, on the part of a consumer, is not warranted in view of the fact that he can subject the finishes to an intelligent program of tests designed to approximate the conditions which the finished product will meet in the field of use, and obtain far more accurate results than any empirical relationship between chemical composition and physical performance would show. It must also be pointed out that modern chemistry is producing and improving materials at such a rate that the results of such research soon would become obsolete.

THE manufacturer cannot stop at determining the best material to use for a specific purpose. He must also study the best conditions for applying the material to obtain the best results, and in this respect he is well advised to follow the recommendations of the producer of the selected material. Many an excellent lacquer or enamel has produced an inferior finish because the man applying it has used some thinner or diluent which is chemically unsuited for that material.

Another source of trouble is encountered in the attempt to control "blushing" under certain weather

and Finishing

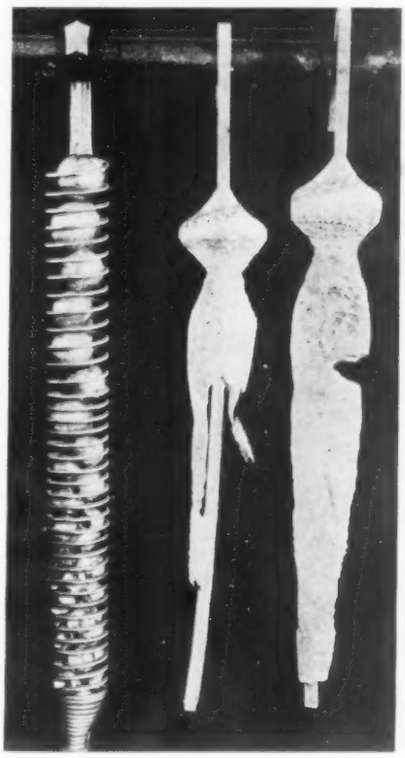
conditions without consulting the manufacturer of the finishing material. All reputable paint and lacquer companies are honestly concerned with the good reputation of their products and are always ready to give sound technical advice when difficulties arise in their application and use.

It is always a good policy, wherever possible, to have more than one supplier for a specific type of finishing material. The advantage is apparent to any purchasing agent, but this will call for rigid control to compensate for slight differences in material which will be unavoidable, even when purchasing from a single manufacturer. In this connection the use of specifications, which have been agreed upon in advance by both manufacturer and purchaser cannot be stressed too highly. A complete discussion of specifications, their advantages and limitations, will be given in this department at a later date.

HAVING determined the best material to use, the best conditions under which to apply it, and having provided for a means of control of the materials "as purchased," it yet remains for the consumer to assure himself that his finished product will be uniform and meets the expectations promised by the testing program used in the selection of the finishing material. This again calls for the use of specifications or "operating instructions" which must be adhered to by the finishing department.

A reasonable check upon the finishing department can be maintained by taking samples of the finished product and subjecting them to the same tests which were used in selecting the most suitable finishing material. All these precautions may sound unwarranted and expensive to some manufacturers, but a testing staff may be worked into the production staff to such an extent that a maximum of control can be maintained with a minimum of expense.

Control of quality is a byword in finish practice as well as any other branch of production. The reign of rule-of-thumb methods, long a curse in finish practice, is over, because modern standards of quality, uniformity and economy necessitate scientific study and control of every step in the production of a modern finish. The rigid maintenence of high standards pays dividends in terms of reputation and confidence which eventually translate themselves in the form of cash profits.



Comparison of ball and slab anodes. A container filled with balls at the left; as the balls corrode, new ones are added at the top. Corrosion typical of slab anodes is shown in the illustrations at the right

Develops Ball Anodes for Zinc, Brass and Copper

Ball-type anodes for zinc, copper and brass plating have recently been placed on the market by the Udylite Co., Detroit. This type of anode has been used extensively in cadmium plating for the past eight or ten years and led to the development work with other metals. The company is prepared to furnish pure electrolytic copper balls, either pure or alloy zinc balls, and standard 80 per cent copper 20 per cent zinc brass balls.

The accompanying illustration affords a visual comparison between ball anodes and common slabs. At the left is a container filled with balls. As the latter corrode, they descend in the container and a fresh anode is added at the top. With ball anodes, more area is exposed, consequently fewer pounds of anode metal is required to obtain a given anode area. At the right is shown corrosion typical of slab anodes. Their area decreases as they corrode, disturbing the metal content of the bath. Considerable scrap loss is experienced with this type of anode.

Studies Cold Cracking and Peeling of Finishes

If a finishing system is to be resistant to failure by cold cracking and peeling, it must meet four important requirements, Dr. E. A. Fluevog, research chemist, fabrics and finishes department, E. I. du Pont de Nemours & Co., Wilmington, Del., asserted at the midwest regional meeting of American Chemical society's paint and varnish division in Louisville, Ky., recently. These four requirements are:

(1) The finish must have good initial adhesion to the substrate;

(2) The finish must be sufficiently impermeable to prevent large quantities of moisture from passing through the film and causing temporary loss of adhesion;

(3) The finish must not react with the substrate, otherwise permanent loss of adhesion may result;

(4) The finish must remain sufficiently flexible so that its co-efficient of expansion at low temperatures is at least equal to that of the substrate over which it is applied.

"Cold cracking failures always appear at the undercoat-metal interface," Dr. Fluevog stated. "In studying the relationship of the adhesion of finishes to their resistance

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to cold cracking, it was found that unless the finishing systems had developed permanent loss of adhesion, the presence of moisture at the film-metal interface was almost always necessary to obtain cold cracking failures. Thus, by increasing the water impermeability of the finish, cold cracking may often be minimized."

Dr. Fluevog stated that laboratory tests had verified the undesirability of an extremely high build of finish by allowing the old finish to remain, and he stated that it is imperative that the surface of smooth substrates should be treated in order that the paint may establish an efficient bond. He added that reactive substrates, such as zinc coated metals, finished with standard finishes, show early permanent loss of adhesion undoubtedly due to a reaction between the vehicle in the finish and surface of the substrate.

Welding Review Now in Book Form

Symposium on Welding of Iron and Steel; cloth, two volumes of 696 and 984 pages, respectively, 5½ x 8¼ inches; published by the Iron and Steel Institute, London; supplied by STEEL, Cleveland, for $11.00, postpaid; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

THESE two volumes constitute the proceedings of a symposium on welding of iron and steel organized by the Iron and Steel institute in co-operation with a number of other technical societies and conducted on May 2-3, 1935, during the institute's annual meeting in London. The symposium was arranged upon suggestion of the British government which believed the subject of welding had not been studied sufficiently.

A Guide to Future Work

The object of the symposium was: To review the position of welding in all its industrial aspects, both in Great Britain and other countries; to obtain knowledge of the problems encountered in welding as employed by the various industries in Great Britain and other countries; to reveal what research work has been or is being undertaken; and to consider the advisability of taking steps to co-ordinate research work and to stimulate and guide future research, possibly with a view to formulating a national scheme.

The printed volumes embrace about 150 technical papers specially written for the symposium and contributed by 15 technical societies, including several foreign societies. Indicating the international character of the symposium, the papers originated as follows: Great Britain 84, Australia 10, Canada 2, India 4, Austria 4, Belgium 1, Czechoslovakia 2, France 9, Germany 9, Holland 2, Italy 2, Norway 1, Poland 3, Sweden 2, Switzerland 1, United States 14. The two volumes contain hundreds of tables, sketches and halftone illustrations.

The papers are divided into five main groups, each of which is prefaced by a summary. Each group is followed by a record of the verbal and written discussion on the papers, and the authors' replies to the comments. Group 1 is incorporated in Vol. I and groups 2, 3 and 4 in Vol. II.

Group 1 deals with present-day practice and problems of welding in engineering industries and is in turn broken down into two subgroups. Subgroup (a) is concerned with bridge and structural engineering; pressure vessels, including boilers, pipe lines, tubes, tanks and vessels for use at high temperatures and pressures; railway material; and shipbuilding. Subgroup (b) is confined to the aeronautical; automobile; chain; electrical; heavy engineering and machinery manufacturing, including marine; iron and steel casting; and wrought iron industries.

Group 2 deals with welding practice and technique, including welding apparatus. Group 3 treats with the metallurgy of welding. Group 4 concerns specifications, inspection, testing, and safety aspects of welding.

Discussion has not been confined to particular methods of welding, but much space is devoted to fusion welding, both by the electric arc and the oxyacetylene methods, since it is in the consideration of these that the most interesting problems arise in technique, in metallurgy, in testing and perhaps most important of all, in design. The information on these and kindred subjects is believed to be comprehensive.

Processes Not Emphasized

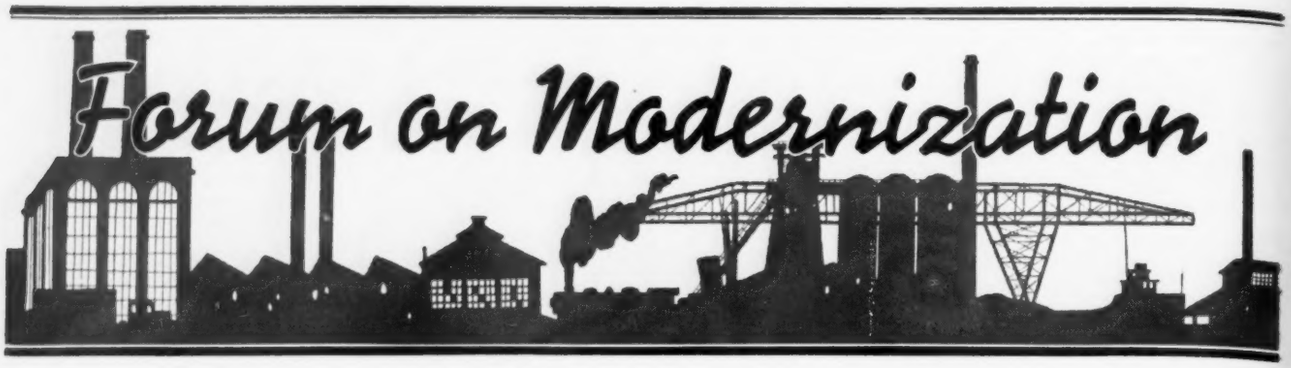
Certain aspects of welding have not been handled with the same completeness. No attempt has been made to include a comprehensive account of different types of plant or of particular processes. Similarly, the applications of resistance welding mentioned in the papers are not exhaustive. Treatment of these matters, where included, has necessarily been general, but more detailed analysis, it is believed, would not have brought to light new problems or elucidated further those which are discussed.

Only incidental mention has been made of the training of welders. The importance of adequate training is fully appreciated, but these volumes deal with materials and not with the men by whom they are handled. The detailed discussion of the revision in building and other regulations which welded structures will necessitate also have been excluded, although the effect of such regulations as are now in force in restricting the design of welded structures will be apparent.

These volumes form a record of the remarkable progress which has been made in recent years in a new method of fabrication. They reveal also gaps in the present knowledge of the subject and point the way to even greater progress in the future; it is confidently believed by the institute that they should be of value to that large and increasing number of engineers in many industries who are finding a knowledge of welding indispensable.

Supports Minor Lights

STEEL, CAST IRON AND WROUGHT IRON have supplanted wood in this structure, ten of which have been installed in the Miami, Fla., main channel, to carry minor lights. Erected by the department of commerce lighthouse service, the unit comprises a pipe skeleton with iron tank house on 6-inch pipe piles, 28 feet high. Piles, columns, and struts are of extra-strength wrought iron pipe. Connecting members are of cast iron. Diagonal tierods are of wrought iron. Platform beams are structural steel, all members being galvanized. Installed on either rock or sand bottom, it is used in waterways not exceeding 17 feet depth mean low water



Proper Application of Motors Saves Power, Increases Production

BY J. W. COREY
Sales Manager, Reliance Electric & Engineering Co., Cleveland

THE history of the United States is one of continually replacing the old with the new. The replacing of old methods, factories and machinery with more efficient units made it possible for industry to put within the reach of the average citizen luxuries impossible without the capital investment for making these economies possible.

The forward-looking manufacturer recognizes that the designers of machinery are continually alert for new methods, and can replace the obsolete machine in his plant with one that will bring his products within the reach of a greater number of people and incidentally increase his production with good profits to himself, his employes and stockholders. The manufacturer who is continually looking for new ideas and is willing to invest in new machinery to carry them out soon finds at his demand the best brains of the machinery manufacturers of the country. These, added to his own force, give him a consulting organization that allows him to choose the best and most efficient machinery to meet changing conditions.

In the case of the manufacturer of electric motors, we find a tremendous change in selling policies and in the product manufactured. In the early days of electric motor application, motors were applied primarily from the standpoint of power, with little thought given to the fact that the proper application had possibilities for increasing production, or simplifying machines. The electric motor first applied to machines was simply an added unit, connected by belts, chains, or gears to a point on the machine that was formerly driven from a lineshaft. No thought was given to motor protection and motors were left open and subject to all the destructive elements commonly found around machine shops and mills. This made an efficient manufacturing arrangement for the motor manufacturer, as the design was much simplified and production could be centered on standardized units.

A study of recent machinery exhibits and new installations of machinery in every industry has shown that the tendency of motor design has run to a great variety of motors to be built into machines. This building of different types of motors for different applications has made it possible for the average plant, by careful study of the motor applications in the plant, to rearrange electric motor applications in such a way as to take advantage of these new types and to make economies both in power consumption and in increased production.

Reducing Motor Maintenance

Certain machine shops have been troubled with high maintenance charges due to the use of open electric motors on equipment machining cast iron. A study of these machines has shown that by the proper application of electric motors of the new economical enclosed type, the installation could be paid for, by decreased maintenance and with less loss of production, in less than a year.

A certain manufacturer using a large number of punch presses found that with the new type of motors particularly built for those presses, he could use motors of approximately half the physical dimensions of those previously used, and by so doing could cut his power bill because of the use of more efficient apparatus and the improvement of power factor which the smaller motors made possible.

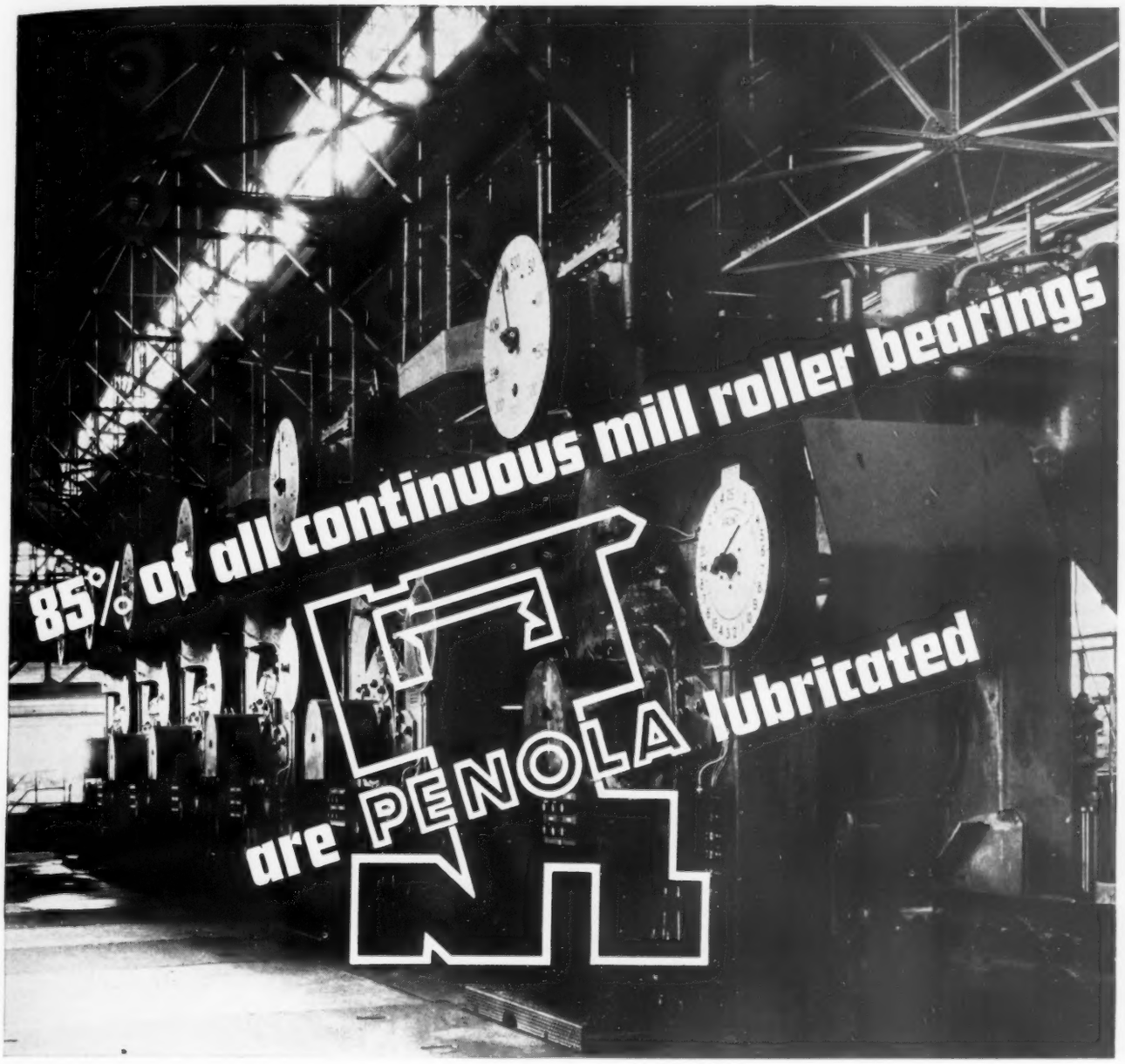
In other applications, the use of adjustable speed or multispeed electric motors makes it possible to obtain more nearly correct cutting speeds, with consequent production increase. This is particularly true on equipment such as crankshaft lathes, which are arranged so that the motor starts at the proper cutting speed at the maximum outside diameter, and continues to increase in speed and keeps a constant cutting speed as the tool approaches the center of the machining operation.

Former Methods Obsolete

At the present time there are dozens of types of special adaptations of electric motors with special characteristics, and enclosing features, which represent the advancement in the art of applying electric power from a production standpoint and in a more efficient method, each one tending to obsolete electrical equipment that is now installed.

Tremendous advances have been made in the control for operating these same motors, and a study of most plants that have not been re-equipped for the last five years will show that increased production could be obtained, and maintenance reduced materially, by putting a simple control within the reach of the operator of most machinery.

It is surely apparent that during the depression years, designers of machinery of all types have had plenty of time to use their ingenuity to find new applications for their products and to improve their products, so as to put themselves in advance and increase their markets. A flood of ideas materialized during this period when improvements and attempts to increase markets were uppermost in the minds of executives. This great flood of ideas has made a complete study of every manufacturing plant of any description absolutely necessary, and the concerns which make this study and take advantage of these new ideas are going to prosper in the prosperity that is now arriving.



THE fact that 85% of all continuous hot strip mills equipped with roller bearings are lubricated by Penola is striking proof of the high performance of Penola lubricants.

When continuous hot strip mills first appeared, the extreme pressures involved called for a new lubricant of much higher film strength than any then in use. In addition, the fine finishes on the costly roller bearings had to be safeguarded against pitting and corrosion. Ladex Lubricant was pioneered and developed by Penola expressly to meet these demands.

Today, with some hot mills rolling wide strip of almost incredible thinness, Ladex is even more essential. It assures the proper roller bearing lubrication that prevents wear, maintains the rolls in perfect alignment and thus assures continuously accurate material.

Next time you have a lubrication problem, talk it over with a Penola engineer. He'll save you money and valuable time. Make it a rule to rely on Penola, leader in steel mill lubrication for half a century.

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METHODS AND MATERIALS

Porcelain Enameled Panels Used on Bakery Trucks

Because porcelain enamel is sanitary, attractive and economical to maintain, a West Coast bakery is using this material to finish the outside of its delivery trucks. The only areas of the last five trucks which were not covered in porcelain enamel are the roof, fenders, hood, cowl and front door panels. As more experience is accumulated, it is probable some of these will be so finished.

The body builder fits the 18-gage steel panels over plywood panels in the same manner as usual. They are "broke" around the metal door pillars and are drilled for metal screws on their four edges. Instead of being fastened on, the panels are sent to the enameler where the porcelain enamel is sprayed on in a number of thin coats. Each coat is fired for at least 5 minutes at a temperature of 1700 degrees Fahr.

The ground coat of the color desired is first built up and then the lettering is "shot," using zinc stencils. The lettering is porcelain enamel and is fused in to become an integral part of the surface. Ceramic transfers (decals) are obtainable which may be fired on, but have not been used yet because of the initial expense involved and because of a probable future change in lettering and design which would obsolete the decals.

When the panels are completed, they are returned to the body builder and mounted in the usual manner. There are no exposed screw heads and the general appearance of the unit is that of a high class paint job. The methods employed by the enameler in handling the panels has been such as to produce a perfectly flat surface without warp even though some of the panels are 89 x 38 inches in size.

Stainless Steel Grilles

TO PROTECT show window displays at night without destroying their display value, rolling stainless steel grilles are now available which afford protection against burglary through breakage of the glass, and yet permit clear vision of the interior. Manufactured by the Cornell Iron Works, New York, these grilles consist of rolled and pressed stainless steel bars joined together with strong ornamental links and with straight links in the side guides. They coil on a pipe shaft above the lintel and are counterbalanced by helical springs. The grilles operate in a manner similar to a window shade and they are lowered and raised either manually or electrically. These grilles are also used for protecting such openings as store entrances, counters, gateways and windows. As effective as prison bars but far more attractive, they provide complete protection without blocking the view. This illustration shows two of the grilles installed in an Oklahoma station of the Atchison, Topeka and Santa Fe railroad

S S S

Removal of Surface Metal Helps Fatigue Resistance

That a large increase in the resistance to fatigue of galvanized steel wire can be produced by removing the surface metal, is the conclusion reached by the national bureau of standards, Washington, as the result of a long series of endurance tests.

In commenting on this apparently anomalous result, the bureau points out that it is well recognized by materials testing engineers that the measured properties of a metallic material may be decidedly influenced by the character of the surface of the test specimen. This is especially true for the fatigue or endurance limit of a metal.

It is not so well known, however, that some surface treatments may also affect certain properties of a metal, at least as oridinarily determined. The effect appears to be most pronounced when the ratio of surface area to volume of metal is relatively large, as in wire, it was stated.

Recent endurance tests of wire by

the pulsating tension method in the bureau's metallurgical laboratories showed that an increase in the endurance limit of wire (galvanized and approximately 0.2-inch diameter) of over 100 per cent was obtained by removing the surface metal, the thickness of the layer removed being equivalent to somewhat over 10 per cent of the initial diameter. This is not an indictment, however, against any particular method of galvanizing, the bureau points out.

S S S

Alloy Addition Improves Chrome Steel Weldability

Since the addition of titanium and columbium to 4 to 7 per cent chromium steels eliminates air hardening, it is natural to expect that the welding properties of these steels will be improved. Results of an extended research program in welding practice indicate that these steels may be satisfactorily welded with a rod containing columbium and 6 to 8 per cent chromium.

The presence of either columbium or titanium also reduces the annealing time to minutes instead of the hours often required for steels not bearing these elements. Because of this effect, marked improvement in ductility can be obtained in the weld by a simple blowpipe anneal. This consists of heating the weld with the blowpipe to a red temperature—1475 to 1650 degrees Fahr.—for 1 or 2 minutes. The softening range varies from 1300 to 1650 degrees Fahr. so the annealing can be performed without difficulty.

S S S

Announces Two Greases For Steel Mill Lubrication

Tide Water Oil Co., 17 Battery Place, New York, announces a new grease, branded Tycol grease No. 845, for use in Timken roller bearings in steel mill service, particularly on roll necks. It is a water resistant, extreme pressure grease which has been tested and approved for this service by Timken Roller Bearing Co., Canton, O. It is noncorrosive to steel, brass or any metals which may be used in plain or antifriction bearings and has an exceptionally high load carrying capacity. Its consistency is such that it may be applied by grease guns, high pressure greasing systems or grease cups.

Tide Water also has added a complete line of calcium base greases made with cylinder stock and possessing greater lubricating effectiveness than greases of similar type made with low viscosity neutral oils. Known as Tide Water Green Cast greases, these greases are applicable to a wide range of service; they are used in steel mills for plain and antifriction bearings on mill tables and for high pressure application to antifriction roll neck bearings where the manufacturer does not specify an extreme pressure grease. They also are suitable for pressure greasing systems, applying grease to bronze or babbited roll necks on small low pressure mills.

Internal Gears for Overdrives Are Finished on Special Machine

A FINISHING machine operating on the same fundamental "shaving" principles as the Michigan Tool crossed axes machines now used in many gear plants for finishing helical and spur gears, has been developed and placed in production by Michigan Tool Co., Detroit. The development resulted partly from demand for methods of finishing internal gears to the same accuracies and quietness as in the case of modern helical gears, and partly from the spreading use of overdrives in automobile transmissions, where extremes in quietness are demanded.

While special purpose in character, the new machine, notable for its compactness, is flexible in that the pot-chuck in which the internal gear is mounted, is fitted with adapters which can be varied to take virtually any normal size of internal gear.

It will be noted from the illustration that the laminated or serrated cutter is mounted on a vertical arbor. This arbor is in turn mounted in an eccentrically driven holder. The feed is ingenious. As the cutter carrying arbor rotates—driving the internal gear which is free to turn, with its adapter, on roller bearings—the arbor holder slowly rotates eccentrically so that the arbor itself moves gradually on an arc, approaching the internal gear. As it moves on this arc, the cutting teeth thus feed outward, and into the internal gear teeth.

At the center point of this arc, representing the closest approach of the arbor to the internal gear, the pitch circles of the cutter teeth and the internal gear teeth coincide, and the maximum depth of cut has been reached. The cutter continues beyond this point, the arc again moving away. At the end of travel on this arc, the machine automatically reverses and the arbor travels back through the same arc. It will be noted that on the forward travel, the flanks on the back side of the internal gear teeth are finished, while on the reverse travel the flanks on the forward side of the teeth are similarly shaved.

Axes for the arbor and for the in-

Detail of new internal gear finishing machine, operating on the same crossed axes principle as rack-type finishers for spur and helical gears. Note eccentric mounting of the cutter which moves back and forth slowly over an arc while rotating

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ternal gear are of course at an angle to each other, this angle being readily adjustable for either large or minute amounts. Usually there is a five-degree difference in helix angle between cutter and gear teeth. The crossed axes of course result in a relative sliding motion of the cutter and work teeth, lengthwise of the tooth, thus producing the previously noted shaving action diagonally across the flank.

Length of arc is also adjustable, together with rate of speed and location of automatic stop and automatic reverse. The table carrying the pot-chuck is adjustable to provide for varying center distances with different gears, etc. All adjustments, involving tooth form and the like, can be checked either by the graduation provided, or through the use of a sine-bar.

For relatively fine pitches the use of laminated cutters seems to work out best, while with 8-pitch gears or coarser, solid cutters with serrations cut in could be used.

The design of the machine is particularly effective in providing a ready means for washing out all chips, cutting fluid flow being from below into the work, and washing out downward also.

Investigate Load-Carrying Capacity of Steel Columns Reinforced by Welding

MANY steel bridges have become inadequate in strength not so much because the bridge has deteriorated, but because the loads which they are required to carry are much greater than the load for which they were designed. A convenient method that has been used to strengthen these bridges is to increase the section of members by welding longitudinal steel plates or shapes to the members while they remained in place on the structure.

It is a matter of common experience that when a longitudinal plate or shape is welded to a structural member, longitudinal thermal stresses are produced which may have considerable magnitude. These stresses are due to the large variation in temperature which occurs over a transverse section immediately after a weld is made. There is a narrow longitudinal strip adjacent to the welds that is hot, whereas the steel some distance from the welds is comparatively cool.

After the welds have been completed, the whole member gradually cools to the temperature of the surrounding air. All parts are cooled, but some more than others. Portions that cool the most shrink the most, and this difference in shrinkage causes residual longitudinal stresses in the steel, tension at some portions of a section and compression at others. The question of importance to the structural engineer is, "Do these residual longitudinal stresses affect the load-carrying capacity of a steel column?"

Research Is Projected

To develop information relative to this question, the engineering experiment station of the University of Illinois, Urbana, Ill., in co-operation with the Nickel Plate railroad, undertook an investigation which has just been reported in experiment station bulletin No. 280, entitled "The Effect of Residual Longitudinal Stresses upon the Load Carrying Capacity of Steel Columns." The work was carried out by Wilbur M. Wilson, research professor of structural engineering, and Rex L. Brown, research associate in theoretical and applied mechanics.

Conclusions reached in the investigation are of interest:

1. If structural steel members are reinforced by welding longitudinal

200-Ton Steel Butterfly

HERE is a 400,000-pound 168-inch alloy steel butterfly valve which the Hardie-Tynes Mfg. Co., Birmingham, Ala., recently completed for shipment to Boulder dam. The company has received orders for seven of these valves, one 120-inch and six 168-inch.

The valve shown is designed to operate under 300 pounds per square inch pressure, and closes off water from an 82,500-kilovolt-ampere generator. The valve is operated by oil pressure of 1000 pounds per square inch pressure in the hydraulic rotor at the top.

Castings for the unit were made by the Erie Forge Co., Erie, Pa., the heaviest—valve leaf casting—weighing 92,000 pounds. The valve body is in two pieces, together weighing 150,000 pounds. The cast steel was held to the following chemical and physical specifications: Carbon 0.25 to 0.35 per cent; manganese 1 per cent maximum; silicon 0.4 per cent maximum; nickel if necessary (1 to 1.5 per cent was used); ultimate tensile 75,000 pounds per square inch; yield 50,000 pounds per square inch; elongation in 2 inches 25 per cent; and reduction of area 50 per cent.

Main holding bolts are of S.A.E. 2340 steel and ¾-inch holes are drilled for a large portion of their length for electric heating elements for expanding the bolts when installed permanently.

The gentleman on the platform is P. A. Kinzie, one of the designing engineers for the bureau of reclamation in Denver, who devoted much of his time to designing this valve.

plates to the original section, longitudinal thermal stresses will be produced. The thermal stresses usually will be of the order of from 5000 to 15,000 pounds per square inch, and in some instances may equal the yield point strength of the material, which for the columns tested was approximately 36,000 pounds per square inch.

2. If a column that has been reinforced by welding longitudinal plates to the original section is straight after welding has been completed, the unit load-carrying capacity will be as great for the reinforced as for the original column. The tests were made on square ended columns having an l/r ratio of about 65, and this ratio was not greatly affected by the change in section.

3. The columns reinforced with 6-inch x ¾-inch plates were a little stronger than the ones reinforced with 12-inch x ⅜-inch plates.

Gas Association Booklet Reports on Research Work

In commemoration of the tenth anniversary of its testing laboratories program, the American Gas association has just published an attractive 40-page, 2-color booklet which should prove of value to anyone interested in the manufacture, sale or installation of heating and cooking appliances. Entitled "For the Benefit of the American Gas Industry and 63 Million Gas Consumers," it treats with every phase of the association's testing laboratory work, emphasizing in particular what the laboratories have meant to both the gas industry and the public.

Formally, the publication is the 1935 report of the laboratories managing committee of the American Gas association. Copies may be obtained by addressing the association's general office at 420 Lexington avenue, New York; the Cleveland Laboratory at 1032 East Sixty-second street, Cleveland; or the Pacific Coast Branch Laboratory at 718 Towne avenue, Los Angeles.

Develops Compound for Cleaning Metal Surfaces

Berryloid Aero-Clean and Wash is the name of a new cleaner and neutralizer developed by Berry Brothers, Detroit, for preparing metal for painting and for cleaning surfaces that already have been painted. It is said to be harmless to metal, paint, hands and clothing, but to absorb and destroy oil, dirt and grease. This new product is said to have been approved by the Air Corps, United States army.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Lost with All Hands

Loss of the all-welded ship JOSEPH MEDILL, a freighter built in England by the quasi-arc process for the Quebec & Ontario Transportation Co. of Montreal, leaves nothing upon which the engineering world can base an explanation. Apparently all hands were lost in the disaster and the ship had no radio. To those who have weathered the storms of the North Atlantic, it is clear that many things besides opening of the welded seams might have happened.

The belief is current in the Great Lakes region that the storms on these inland lakes are worse than those of the Atlantic ocean, but it is a fallacy. A vessel, loaded as it is in lake service, does not have enough free board for a North Atlantic storm, particularly in case of engine or rudder failure.

It is baffling to have not a single bit of evidence upon which to base an opinion on why these good sailors were lost. They stood out to sea in a fine ship as men have gone to sea in for some 2000 years. All hands were lost. The British as well as American welding fraternity will look to the impartial review of the British Admiralty for a statement of what might have been the cause of this disaster.

To Spend

Pierre Du Pont insists on putting cancer research on a basis whereby the inventor of new and useful methods of treatment is rewarded financially. That is sound and practical. Even Stalin, with almost absolute power, found that his people will invent and produce only if there is an immediate financial reward.

The upper regions of American industry have found out that giving a group of men mere economic security in a research department will not produce a profitable number of inventions. With our present stage of development, there is nothing in the world that is so powerful an inducement for a man to use his brain as the possibility of an immediate financial reward which he can take and spend as he pleases.

Sparks and Flashes

Electrical manufacturers now offer arc welding transformers with high frequency pilot arc which operates at about 1,000,000 cycles per second. With this equipment the arc starts without actual contact of the electrode on the piece being welded. If the welding arc is broken accidentally, the pilot arc starts it again. The apparatus is particularly valuable for welding at low currents. Less skill is required to do arc welding with the pilot arc in use. By making welding easier to do, manufacturers increase sales of their equipment.

* * *

We recently had lunch with a man who has taken out more than 250 patents, many of them in the welding field. He was not "just like anyone else." Consummation of his plans is in sight, whereby he will abandon completely all efforts which involve making any more money for himself. He proposes to employ his creative imagination, with which he is greatly gifted, in the interest of the common good.

We do not believe it will work. He will have to control and dominate his inventions as before to prevent chiselers from doing so in their own interest. John D. Rockefeller's philosophy of getting all the money he could, and then giving it back wisely and in the interest of the common good is more practical. The exceptionally gifted have more responsibilities than ordinary men.

MODERN ROLL TECHNIQUE

Purchasers of Phoenix Rolls have their judgement confirmed year after year by the performances of these rolls under severe operating conditions.

Modern roll technique as practiced by Pittsburgh Rolls insists that Phoenix Rolls be the best that can be made for the service required.

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PHOENIX STEEL, for unusual strength; PHOENIX "A" (steel alloy), for strength and wear; PHOENIX METAL—PHOENIX "K", for strength, wear and finish; PHOENIXLOY (uniformly hard), for flat rolling where high finish of extremely thin gauge of material is required to be free from all marks or defects. PHOENIX CHILL; PHOENIX NICKEL CHILL; for all flat rolling requiring finish. Also tube mill rolls of quality material best suited to the kind of service required.

PITTSBURGH ROLLS CORPORATION

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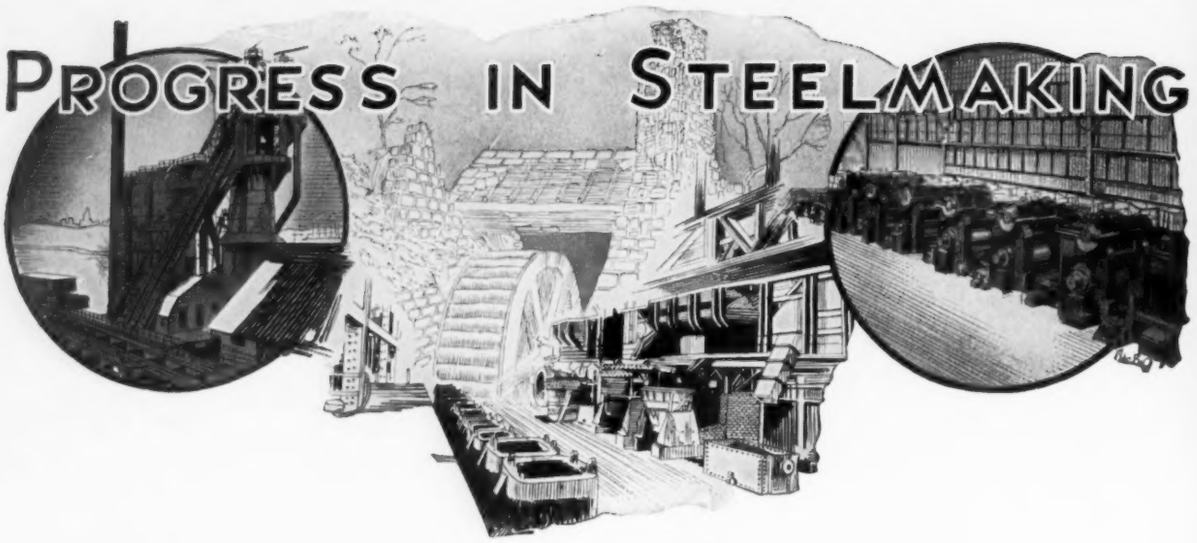
PROGRESS IN STEELMAKING



Centralizes Plant Control

Newly developed central control units for plant protection signaling systems now are fabricated of steel throughout and are equipped with a bakelite control panel. The desks are of value in that automatic signals for the supervision of plant protection and industrial operation terminate there, producing a definite record and calling to the attention of the operator on duty at the desk, abnormal conditions. A desk of this sort produces printed records and gives alarm indication for automatic sprinkler systems, sprinkler water flow alarm, manual fire alarm systems, watch patrol systems, industrial processes, supervising temperatures, pressures, liquid levels, liquid flows, continuity of operation, etc. A simplified electrical circuit connects the transmitting mechanisms that are located adjacent to the point being supervised to the recording desk. Signals initiated at the same instant of time are recorded successively in their proper order on the print recorders located on top of the superstructure of the desk.

• • •

Develops 2-Wheel Open-Hearth Barrow

HEAVY LOADS HANDLED ON CHARGING FLOOR—Barrows built with two wheels now are being used by a large steelmaker for transferring ferromanganese, ferrovanadium, ferrophosphorus, ferrochromium, ferronickel, and other open-hearth additions from stock to the point of consumption. The materials are dumped either directly into the ladle during the tapping operation or into a box on the charging floor from which they are shoveled into the furnace. An ordinary load weighs 1000 pounds although it is not unusual for one of the crew to wheel 1300 pounds over a concrete floor. The load is well balanced over the wheels so that the operator need only push his load. The barrows also are employed for wheeling 22-inch silica brick during the relining of a furnace, the loads averaging about 1000 pounds. The wheels, 16 inches diameter, have a ½ x 2-inch tire and are mounted with roller bearings on a 1⅜-inch axle. A ¼ x 1½-inch strap is welded to the tubular handle to provide a substantial handguard. The legs are built of 1¾ x 7/16-inch channels and are cross braced. Front braces are made of ⅜ x 1½-inch material. The new 2-wheel open-hearth barrow is made by the Toledo Wheelbarrow Co., Toledo, O.

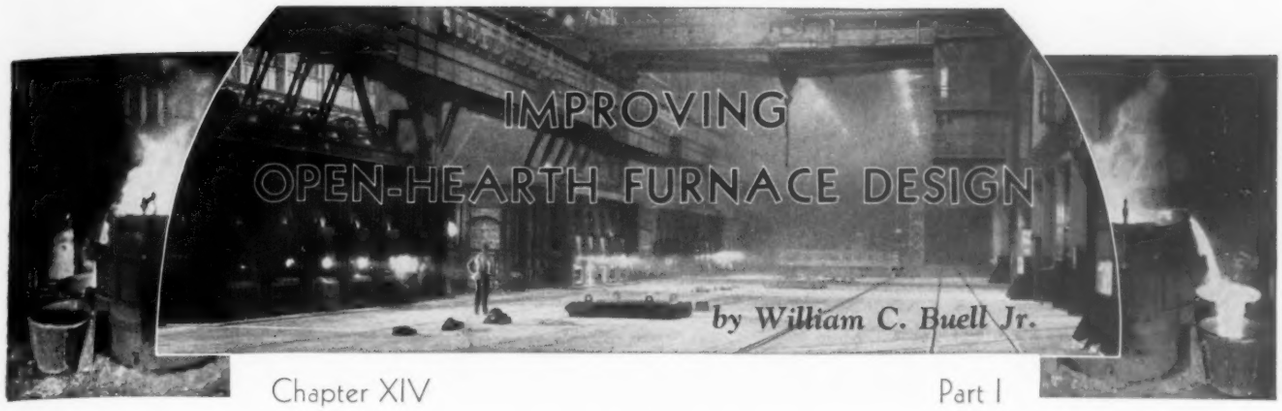
Iron Skimmed Three Times

Triple skimming of iron is employed by a Southern producer of merchant iron. The molten metal first is skimmed while flowing from the iron notch to the ladle. Certain impurities, which rise to the surface of the molten iron in the ladle, are skimmed and raked off at the pouring trough of the casting machine. The skimmer at the pig machine is of the double Kileen type, two brick dams spaced about 3 feet apart being employed in the well of the trough.

• • •

Protects Steel Surfaces

To protect interior and exterior surfaces of steel against abrasion, corrosion and acids is the purpose of a new liquid rubber. The product also has been improved by the development of a priming compound one coat of which affords satisfactory results. Both the priming and liquid rubber can be applied by brushing, spraying or dipping. The product is unaffected by heat up to 200 degrees Fahr. and cold down to 120 degrees below zero. The antiabrasive grade is used to protect surfaces exposed to severe wear; it is highly resistant to the destructive action of sand, ore, coal, coke and gravel on conveyor belts, hoppers, chutes and in mixers. The product also protects splices in wire ropes and various types of metal and wooden tanks. It vulcanizes itself cold, remains resilient permanently, and does not harden, age or crack.



IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter XIV Part I

Summary

THIS treatise on the ancillary system of the open-hearth furnace and those which have preceded it concerning the primary or upper furnace have considered the subject of open-hearth design under two dissimilar categories, that of the use of the materials of engineering, in the construction of the furnace and system, and again of the effects of the flow of the fluids of the process within the structure which are incident to operation. A high order of design in both branches equally is essential as a prerequisite of economical and successful ingot production. Within the scope of the first category the design of the binding steel of slag pockets, fantails and regenerators has been analyzed fully under the premise that a stable structure of sufficient strength to maintain the brickwork to its initial outer dimensions is a prime essential if low depreciation and upkeep costs are to result and the fundamentals of such design of such practice expounded. For instance, while a delineated regenerator design that includes superior thermal qualities, a savings of about 80 tons of structural steel is shown as possible (Table CXX) over the less efficient arrangement more commonly found installed.

Alteration Affords Savings

It has been demonstrated that given an ordinary layout arrangement, a set of regenerators having a refractory cost of $26,785 will have amassed a total cost at the end of ten years of $133,783, including radiation, but that if the layout is altered slightly and refractories included initially costing about $1000 more or $27,422, at the end of ten years the overall cost will be but $66,467 (Table CXVII), or developing a savings by this single improvement in the system of about $7000 a year.

Slag pocket refractory costs likewise are analyzed (Table XCVII).

The importance of correct layout of the ancillary system collectively, and of the several elements individually with particular regard to the interrelation of layout and operating effects have been given considerable discussion, and better layout looking towards the improvement of operations suggested. The selection of valves and waste heat boilers have been considered and an unusual line of reasoning presented on the economics of the installation and use of the latter.

The foregoing all having reference to the physical structure is included in the first of the categories specified in the initial paragraph of the chapter.

The second of the categories considers the lines of the structure or the development of the inner faces of the masonry to such areas, volume, perimeters, contours, profiles or angles as will best control the flow of the gaseous fluids of the process to effect most rapidly and economically the results sought.

High Flow Is Essential

Within the limits of the furnace system relatively high speed of fluid flow is necessary to create turbulent flow to accelerate mixing of fuel and air in order to increase the rapidity of the combustion reaction. The areas in the vicinity of the knuckle A_2 are designed to accomplish this effect and the contiguous profiles are developed to control the flow lines of the resulting flame.

Then where heat transfer properties are sought or gas cleaning desired the gases are reduced in velocity to the extent through enlarged areas necessary. The areas at the laboratory over the bath at A_1 and through the checkers are increased to enhance heat transfer properties as a result of lower velocities, and in the slag pockets to accentuate the removal of gas-borne matter.

Through the fantails and connecting flues, the masonry surface is contoured carefully to improve distributional effects, and at the valves the normal system velocity may be increased slightly on account of sharper regulation and in order to prevent the accumulation of process dust.

With the foregoing exceptions the flow essentially should be constant throughout the balance of the system and as a result of the investigations upon which this work is founded it appears that the maximum relative velocity of the furnace gases as at 32 degrees Fahr. should not exceed 15 feet per second, in an effluent system excepting that if slide type valves are included the relative velocity through them may be increased to about 20 feet per second.

Why Selection Was Made

The value of 15 feet per second was selected as being the greatest at which erosion resulting from fluid action would remain nominal even at elevated temperatures, and the least at which heat exchange would not be unnecessarily high.

A furnace may be designed to use any of the ordinary fuels excepting producer and possibly preheated mixed gas on the 15 foot per second basic velocity and the size of the resulting structure will conform to accepted ideas. However, were furnaces to operate on the preheated gas fuels designed to the basic velocity a structure of much larger size than now is found would be necessary on account of the materially larger volumes of the combustion products. While it unquestionably would be advantageous thermally to design the preheated gas furnaces to the basic figure the contingent increase of building dimensions likely would minimize the operating improvement coming from the larger furnace. Therefore, as the most satisfactory compromise the allowable maximum relative velocity in the effluent system of a preheated gas-fired furnace is established at 20 feet per second excepting through slide valves where the speed may be increased to 25 feet per second.

The values are developed as applying to the speed of furnace gases passing through an effluent system.

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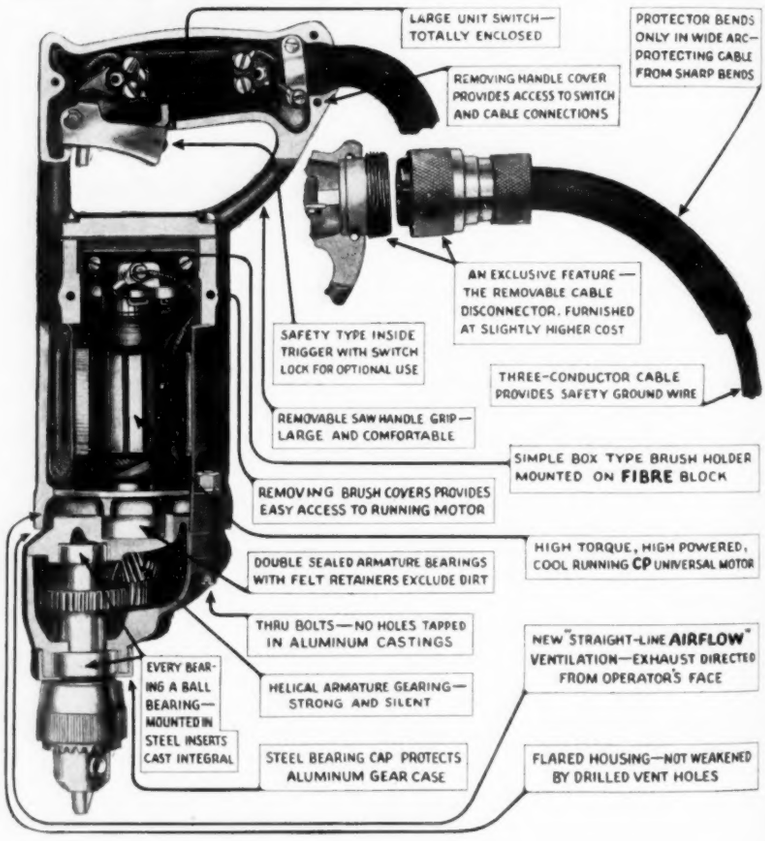
The adjoining sectional view of a Pistol Grip Type of CP Universal Drill shows general features of design and construction which are typical of the entire line. Complete details are available in a special bulletin—No. 899—just published. Send for your copy . . . now.

TYPICAL CONSTRUCTION CP UNIVERSAL HEAVY DUTY PISTOL GRIP DRILLS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The volumes of the furnace gases are somewhat larger than those of the combined fuel and air in preheated gas practice, and substantially larger than the air in cold fuel practice and all fluid temperatures are inherently lower and thus it follows that the relative velocities through the influent system will be less than those through the effluent.

Relative velocity values for the typical furnaces through the various components of the ancillary system have been developed and presented in this treatise where appropriate. Such data have served for the design base of the several elements. This flow data has been assembled for comparison and is presented in Table CXLIX. In addition to the data found herein the flow values at the knuckles and over the bath are included in order that the principal flow condition throughout the entire open-hearth system may be examined. The various elements and controlling areas are listed beginning at the fuel and air inlets or the influent system, then through the upper furnace and into the air and fuel sides of the effluent system, and finally into the stack system. Those elements or areas, which are highly critical to operating results, are indicated in heavy type. The volumes of the several fluids of maximum operation in cubic feet per second are shown on the lines bearing symbols a, b, c, etc., while the relative velocities, feet per second as at 32 degrees Fahr. are given on the numbered lines. In considering the tabular figures it should be particularly borne in mind that the values are calculated as being one and one-half times those of average operation, and thus are presumed to represent operation at maximum rates. In open-hearth practice maximum firing rates must be maintained for periods of an hour or more during each heat and consequently the reactions accruing to the furnace structure from maximum firing rates will develop. The method employed appears the rational basis of design in this practice.

The following general comments anent the tabular values will be of interest:

In the gas inlet system, only the designs of the gas flue, valve and nozzle, lines 1, 2 and 9 will be developed to the flow of the fuel gas. Area A_9 the nozzle particularly is critical. A relative velocity of 70 feet per second is the product of about 1.0 inch water pressure (Fig. 46) while nearly 1.75 inches water pressure is required to develop 90 feet per second relative velocity. Thus a 30-per cent increase in velocity requires approximately double the pressure to deliver an equal volume. Obviously, the pressure at the nozzle will be es-

Table CXLIX

Summary of Critical Operating Velocities as Found in Typical Furnaces and Maximum Ideal Velocities as Developed

(Most Highly Critical Elements and Velocities in Bold Faced Type)

		GROUP A FURNACES					GROUP B		GROUP C		GROUP D FURNACES						
Fuel Gas Inlet	Line	Ideal	A	J	K	N	O	I	P	G	L	Ideal	B	D	E	H	F	M
System—Fuel, Ft.³	a	.....	211.0	183.0	192.8	255.0	278.0				107.5							
Gas flue	1	20.0	21.8	29.2	16.9	23.8	21.3				5.0							
Gas valve	2	25.0	32.5	29.2		38.1	41.6				21.5							
A12G	**3**	**12.0**	**19.9**	**15.6**	**13.0**	**13.7**	**15.0**				**6.8**							
Checkers	4	4.0	5.4	7.1	4.4	5.7	6.3				7.6							
A11G	5	12.0	17.3	16.2	12.3	22.9	24.9				7.0							
A10G	6		7.9	5.7	7.6	7.7	7.7				3.1							
Slag pocket	7	15.0																
Uptake A7	8	35.0	45.0	30.8	49.5	47.2	47.5			40.7	14.4							
Nozzle	**9**	**70.0**	**85.8**	**94.0**	**82.9**	**92.5**	**92.6**			**31.9**	**69.2**							
AIR INLET SYSTEM																		
Air, ft.³	b	.....	232.0	201.3	212.0	280.0	310.0	268.5	228.0	200.8	235.0	.....	173.0	161.5	205.8	188.7	187.3	222.1
Air Inlet Valve A13	**10**	**12.0**	**17.8**	**17.2**		**23.9**	**26.5**	**9.8**	**14.1**	**20.6**	**12.8**	**12.0**	.....	**13.8**	**17.6**	**12.8**	**10.2**	**12.1**
Air flue	11	15.0	19.9	16.1	11.5	17.6	19.2	7.6	11.0	11.5	10.9	15.0	6.6	8.2	10.4	9.2	4.8	13.7
A12A	**12**	**12.0**	**12.1**	**5.4**	**8.2**	**9.1**	**10.0**	**6.0**	**6.3**	**5.4**	**9.6**	**9.0**	**6.1**	**4.8**	**4.7**	**4.8**	**5.2**	**5.5**
Checkers	13	4.0	3.5	3.7	3.0	4.1	4.5	2.4	1.4	1.5	10.3	2.5	2.4	2.8	3.7	1.8	3.0	2.7
A11A	14	12.0	11.6	5.9	9.8	16.1	17.8	7.7	4.9	7.0	6.4	9.0	5.5	5.0	8.5	6.5	4.8	6.1
A10A	15		7.1	3.1	6.9	5.5	6.1	5.9	5.5	8.2	3.0		4.6	6.8	5.4	5.6	5.4	7.4
Slag pocket	16	15.0										15.0						
Uptakes A6	17	15.0	27.8	6.7	9.9	17.8	15.8	9.8	7.8	10.3	13.4	12.0	6.7	9.2	8.5	7.8	6.7	8.9
UPPER FURNACE																		
Knuckle A2	**18**	**20.0**	**26.6**	**21.9**	**18.8**	**26.5**	**27.8**	**14.0**	**17.2**	**10.8**	**16.8**	**12.0**	**8.1**	**8.2**	**9.1**	**12.1**	**9.8**	**12.6**
Laboratory A1	**19**	**12.0***	**11.7**	**9.1**	**8.5**	**11.9**	**10.4**	**8.1**	**6.0**	**8.1**	**8.9**	**10.5***	**4.7**	**5.1**	**6.0**	**5.8**	**6.4**	**5.6**
Knuckle A2	**20**	**20.0**	**27.1**	**21.8**	**18.6**	**26.3**	**27.6**	**13.8**	**16.9**	**10.8**	**16.7**	**12.0**	**8.0**	**8.1**	**8.9**	**11.9**	**9.6**	**12.4**
EFFLUENT SYSTEM AIR																		
Furnace Gas, ft.³	c	.....	265.8	230.6	242.8	321.0	349.8	298.3	253.0	288.5	341.0	.....	19.20	179.5	228.5	209.6	220.3	247.0
Downtakes A6	**21**	**15.0**	**39.1**	**8.6**	**15.1**	**25.4**	**21.9**	**12.4**	**9.8**	**18.5**	**16.7**	**12.0**	**8.5**	**11.5**	**10.7**	**9.8**	**9.0**	**11.2**
Slag Pocket	22	15.0										15.0						
A10A	23		9.4	4.6	9.6	7.5	8.2	7.6	6.4	13.6	6.1		5.9	8.6	7.0	7.2	7.4	9.5
A11A	**24**	**12.0**	**15.2**	**8.0**	**13.7**	**21.8**	**24.0**	**9.8**	**7.1**	**12.1**	**12.6**	**9.0**	**7.0**	**6.4**	**10.9**	**8.3**	**6.6**	**7.8**
Checkers	**25**	**4.0**	**4.9**	**5.1**	**4.1**	**5.6**	**6.1**	**4.6**	**2.1**	**3.4**	**10.5†**	**2.5**	**3.0**	**3.7**	**4.8**	**2.3**	**4.0†**	**3.4**
A12A	**26**	**12.0**	**18.7**	**8.3**	**12.9**	**13.7**	**15.2**	**8.6**	**9.0**	**9.5**	**11.7**	**9.0**	**8.7**	**6.9**	**6.6**	**6.9**	**7.8**	**7.8**
Waste Flue A16A	27	20.0	19.9	16.1	11.5	17.6	19.2	10.0	11.0	12.3	10.9	15.0	6.6	8.2	10.4	9.2	4.8	13.7
Reversing Valve	28	25.0	30.0	18.7		27.6	30.1	13.6	16.1	15.4	14.0	20.0	....	10.5	15.9	18.1	13.8	16.6
EFFLUENT SYSTEM GAS																		
Furnace gas, ft.³	d	.....	177.2	153.7	161.9	214.0	233.2											
Nozzle, A3	29	70.0	89.0	90.0	85.8	84.6	92.0											
Downtake A7	**30**	**35.0**	**44.8**	**29.1**	**62.2**	**43.2**	**47.1**											
Slag Pocket	31	15.0																
A10G	32		7.7	5.5	7.3	7.4	7.5											
A11G	**33**	**12.0**	**16.8**	**15.7**	**11.9**	**22.2**	**24.2**											
Checkers	**34**	**4.0**	**4.9**	**6.4**	**4.0**	**5.2**	**5.7**											
A12G	**35**	**12.0**	**17.2**	**10.5**	**11.3**	**12.2**	**13.3**											
Waste Flue A16G	36	20.0	18.3	13.3	8.9	20.0	15.7											
Reversing valve	37	25.0	27.3	24.7		32.0	35.0											
STACK SYSTEM																		
Furnace Gas, ft.³	e	....	443.0	384.3	404.8	535.0	583.0	298.3	253.0	288.5	341.0	....	192.0	179.5	228.5	209.6	220.3	247.0
Collecting flue, A17	**38**	**20.0**	**32.0**	.....	.....	**28.4**	**31.0**	**9.8**	....	**15.9**	**14.7**	**15.0**	....	**14.7**	**16.3**	**14.1**	**10.3**	**13.1**
Stack flue, A19	**39**	**20.0**	**29.0**	**21.7**		**26.7**	**32.6**	**9.7**	**11.2**	**8.8**	**14.4**	**15.0**	**7.6**	**14.4**	**16.0**	**15.8**	**11.0**	**12.2**
Stack valve	**40**	**20.0**	**29.0**	**21.7**		**31.3**	**38.2**	**14.9**	**11.4**	**8.8**	**15.5**	**15.0**	....	**14.4**	**16.0**	**16.9**	**14.3**	**15.8**
Stack, A20	**41**	**20.0**	**32.3**	**28.0**		**28.2**	**30.7**	**11.6**	**9.0**	**11.2**	**17.5**	**15.0**	....	**15.4**	**8.9**	**18.0**	**8.4**	**11.0**

*Flow factor—See Chapter VI, Vol. 2 (To be published later)
†3-Pass checker design

sentially that of the entire gas inlet system. It is the author's opinion that pressures in excess of 1.0 inch water pressure are liable to overburden the system including the probability of excessive gas leakage, as well as creating inefficient operating conditions at the gas house. An adjustable gas nozzle of satisfactory design would be a boon in producer gas operation.

The air inlet valves, line 10, contain the only highly critical areas of the influent air system.

Velocities Are Important

Even when as in a number of the typical instances presented the furnaces operated under forced draft, the inlet velocities should not exceed 12 feet per second, and velocities under that quoted would be advantageous. Low velocity of the air when entering the system is an assurance of better distribution below the regenerators, if the design of the conveying system conforms to good practice. Entirely satisfactory velocities through A_{12} are found only in furnaces I, F and M.

Comments regarding velocities found in the upper systems of the typical furnaces are omitted, as they are discussed fully in Volume 2 (to be published later).

In accordance with previously stated principles of producer gas operation, the effluent furnace gases are taken as dividing at the furnace throat and that 60 per cent pass through the air system, and 40 per cent through the producer gas system. The various velocities are calculated on this basis.

Between the furnace and the stack system the effluent system contains four areas, of outstanding significance in their effects on overall furnace operation. The first of these is the downtakes. Insufficient area in this component will limit the production of the unit, and the resulting high velocity will cause excessive erosion of the end refractories and contingently untimely and expensive hot repairs and short campaigns. The only remedy for such a condition which exists in a surprisingly large number of plants is complete redesign of the ends and their appropriate rebuilding.

Of the producer and mixed gas fired furnaces, only furnaces J and K show satisfactory design in this respect in the air system, line 21, and only furnace J in the gas system, line 30.

The regenerative system, including area A_{11}, the checkers and area A_{12}, are critical to operation and economy as effecting heat salvage. Velocity at $A_{11}A$ as affecting distribution over the checkers, is too high in furnaces A, K, N, O, I, L and E, and $A_{11}G$ in all of the group A furnaces, excepting K.

The ideal velocity of 4 feet per second through the checker work of the producer gas fired furnaces is exceeded in all of the furnaces of the group in both the air and gas system, excepting in furnace K.

In the fixed fuel fired furnaces the desirable velocity of 2.5 feet per second is exceeded in all furnaces of the B and D group excepting furnaces P and H. The ratio of the ideal to the actual figures is an approximate measure of deficiency of regenerator size necessary to secure the maximum economic heat return. In some cases such a deficiency may be compensated in part by the substitution of a different checker brick arrangement or size.

Any of the four component of the stack system, if of insufficient area will prove a "bottle-neck" in natural draft operation that will absolutely limit fuel or production rates. Group A furnaces fall short when compared to the ideal. All of these furnaces normally operate with forced draft and consequently the satisfactory production rates of these several units are maintained. However, even in forced draft operations, excessive velocities in the collecting or stack flue may be expected to effect the fluid flow in other components unfavorably. In general the stack systems of the fixed fuel fired furnaces develop satisfactory conditions.

(To be Continued)

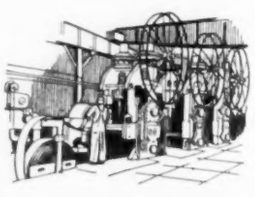
Ford's Hot Strip Mill Has Many Features of Design

(Concluded from Page 36)

grease and oil lubrication systems.

Two central pressure grease systems are installed in the hot mill and a single system handles the grease lubrication for all the bearings in the cold mill. One of the hot mill systems provides grease lubrication to the plain bearings on the roll necks of the blooming mill, the roughing stands and associated equipment, and the other furnishes EP lubricant to the tapered roller bearings on the other mill units. Telltale indicators and alarms are installed on these central lubrication systems to assure positive lubrication at all times. Equipment is provided in each of the central grease houses for heating and straining the greases so that a continuous and uninterrupted supply of grease of the proper consistency is available constantly.

Oil lubrication is provided for all gear drives, pinions and motors; nine circulating oil systems, including the continuous centrifuging equipment necessary to assure the elimination of all dirt and water from the lubricants are installed for this purpose. These separate systems are necessary to provide constant lubrication with the right kind of oil at the proper viscosity. Blended or mineral oils are used depending upon tooth pressures, temperatures and water conditions at the various points. All gear drives and pinion stands use the same lubricant for both the gears and the bearings, the lubricant being sprayed into the meshing points of the gears and baffles or reservoirs being provided to assure constant lubrication of the bearings.



Afforded Rare Opportunity

It is seldom that an opportunity is afforded to design and coordinate a complete steel mill including both mechanical and electrical equipment as well as water, air, lubricating systems, etc., most plants being developed over a period of years, new lines or special equipment being built and installed to meet specific needs as required. However, the Ford steel mill, being built to meet the specific needs of a single company which will use the entire output of the mill, gave the designers an unusual opportunity. The most generally antifrictionized steel mill as yet built, clean, efficient and sightly, coordinated throughout and embodying the latest developments, was the result. The United Engineering and Foundry Co. was engaged by the Ford Motor Co. as engineers on this project.

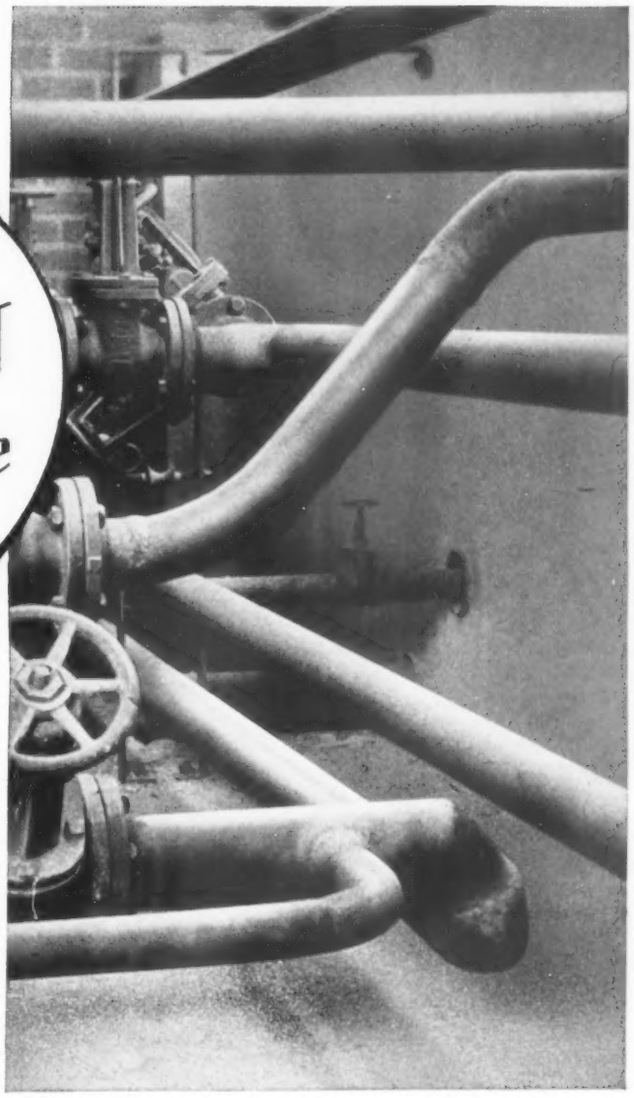
Aluminum Coated Plate Not Satisfactory for Cans

No definite conclusions as yet have been reached, states a leading can manufacturer, regarding aluminum coated plate as a substitute for tin plate in the manufacture of cans. Such aluminum coated material as this consumer has been able to secure has not proved satisfactory.

Develops Streamline Siren

Sterling Siren Fire Alarm Co. Inc., Rochester, N. Y., has developed a new siren which has a streamlined design so as to blend with modern automobiles and fire trucks. The exterior is of sheet brass and the castings, rotor and fan housing are aluminum. It is equipped with a heavy duty, ball bearing motor. The projector is covered with a screen to prevent foreign substances from getting into the mechanism.

Oxwelded piping cheaper FIRST and LAST ...and more dependable



This picture, made before insulation was applied, shows the smooth contours that can be obtained by oxwelding even where headers, tees, and turns are involved in various sizes of pipe.

ON every count . . . first and last cost . . . oxwelded piping is a paying investment. Figures, in hard dollars and cents, prove it.

For instance: Nearly 10,000 feet of piping was installed in a power house and heating plant by oxwelding. Pipe sizes ranged up to 12 inches in diameter to carry oil, exhaust steam, compressed air, steam heat and water. *Even the one-half inch pipe was oxwelded!* Working pressures were 10 to 250 lb. Engineers wanted a permanent, strong job. They wanted jointless piping . . . leakproof now . . . and forever.

Oxwelding gave them what they wanted . . . more than they expected. Every specification that would insure satisfactory performance was more than met. *And in addition*, the oxwelded piping was installed at a 43 per cent saving in labor, time and materials. *This was a clear profit of $19,602 over doing the job by the older methods.*

Cost Records Prove Results

Unbelievable as these figures might seem at first glance, they are fully confirmed by detailed cost records. And what is more, these savings will be multiplied in the years to come, for oxwelded piping is a paying investment year after year. Once in it requires no further attention.

You, too, can get the most out of your piping installations, just as thousands of other companies have done, by consulting first with the Linde organization.

Ask the nearest Linde Sales Office for further details. Offices are located in Atlanta—Baltimore, Birmingham, Boston, Buffalo, Butte—Chicago, Cleveland—Dallas, Denver, Detroit—El Paso—Houston—Indianapolis—Kansas City—Los Angeles—Memphis, Milwaukee, Minneapolis—New Orleans, New York—Philadelphia, Phoenix, Pittsburgh, Portland, Ore.—St. Louis, Salt Lake City, San Francisco, Seattle, Spokane and Tulsa.

Address—The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation.

Everything for Oxy-Acetylene Welding and Cutting

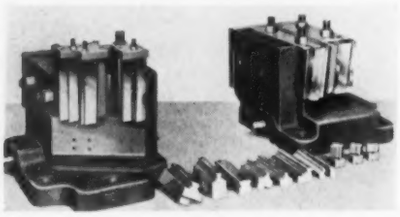
LINDE OXYGEN • PREST-O-LITE ACETYLENE • OXWELD APPARATUS AND SUPPLIES

FROM PRODUCTS OF UNITS OF UCC UNION CARBIDE AND CARBON CORPORATION LINDE UNION CARBIDE

NEW EQUIPMENT

Turning Tools—

Michigan Tool Co., Detroit, is announcing a new line of turning tools, the basic feature of which is a novel method of locating them in the tool holder. The pin splice method, as



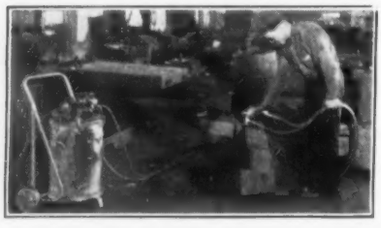
Complete Mitco pin splice tooling setup for an automatic lathe

it is known, combines the advantages of the dovetail and dowel methods. Guide pins are used to locate the tool in the holder. Holder and tool are provided with small diameter semi-cylindrical grooves which are parallel to a line tangent to the work piece at the point of tool contact. Dowel or splice pins fit into these grooves and are fixed in the holder so that the tool can be shifted up and down in the holder to the correct position, using the pins as guides. When in the correct position the tool is locked in place by tightening the clamps of the split holder.

• • •

Core Mold Sprayer—

Gast Mfg. Corp., Bridgman, Mich., recently developed a core mold sprayer designed to paint cores, both green and baked, with considerable savings in time. During application the blacking material or paint is being agitated constantly, which provides a uniform mixture. A 10-gallon tank permits continuous use of the spray.



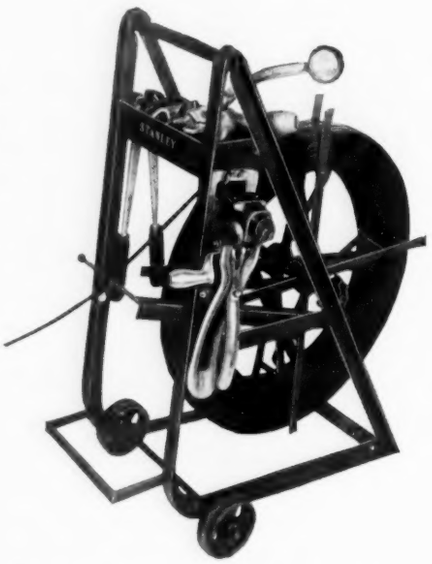
Gast core mold sprayer

It also is claimed that spray painting gives a deeper penetration of the wash into cores and molds and a better binding of the sand.

• • •

All Steel Reel Stand—

Steel Strapping Division, Stanley Works, New Britain, Conn., is marketing a new all steel reel stand that is light in weight. Because of simplicity of design, shown herewith only a few seconds are required to mount a coil of strapping. The reel brake is automatic in operation and positive in action. Pulling the strapping through a guide raises the brake arm which disengages the



Stanley reel stand eliminates strapping waste and loss of time

brake and permits the reel to revolve freely. The moment pulling stops the brake arm falls and locks the reel, preventing any backlash.

• • •

Safety Limit Stops—

Electric Controller & Mfg. Co., 2735 East Seventy-ninth street, Cleveland, is bringing out an improved Youngstown safety limit stop for use as a safety device in preventing over-hoisting accidents on overhead traveling cranes, etc. The device, shown herewith, is of the main

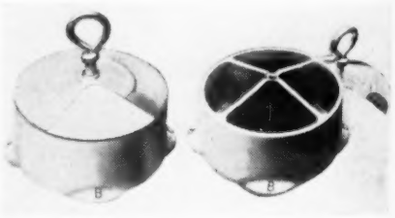
Improved Youngstown safety limit stop announced by Electric Controller & Mfg. Co.

motor circuit type, handling motor currents directly without the aid of additional equipment. When the limit stop is tripped it not only disconnects the motor from the power line but it also brings the motor to rest quickly with minimum drift. A heavy gage gasketed cover is bolted tightly on the enclosing case.

• • •

Flux Pot—

Schlafer Hardware Co., Appleton, Wis., is announcing a flux pot to meet welders' needs. It holds four kinds of flux, is practically dust-tight when closed, is compact and has a ring carrier for convenience.

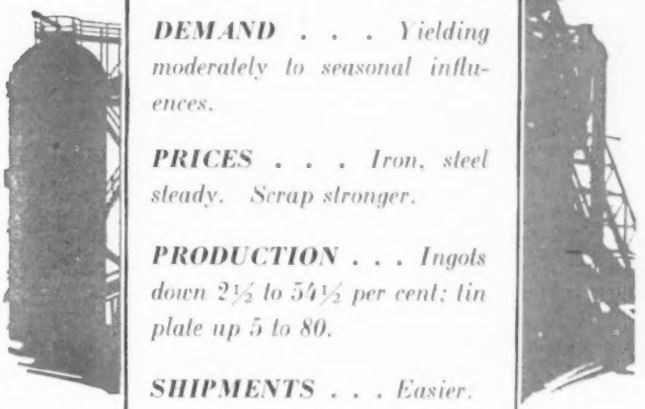


Schlafer flux pot provides convenient device for welders

A slight turn of the cover provides the type of flux required for each purpose. As shown herewith, the cover is readily removed by loosening the top nut. Simple construction of cast iron is another feature.

Steel Yielding to Seasonal Influences; Rate 54½

Sheet, Strip, Tin Plate Mills Still Strong; Pig Iron Topping November



MARKET IN TABLOID

DEMAND . . . *Yielding moderately to seasonal influences.*

PRICES . . . *Iron, steel steady. Scrap stronger.*

PRODUCTION . . . *Ingots down 2½ to 54½ per cent; tin plate up 5 to 80.*

SHIPMENTS . . . *Easier.*

IRON and steel demand is proving unusually resistant to year-end influences.

In pig iron production, so far in December there has been practically no let down, while shipments are 75 per cent over the comparable period in November, and melters' stocks are lower than they had anticipated.

In steel, though ingot output has dropped 2½ points to 54½ per cent, some leading finishing mills have actually increased schedules. Sheet mills are operating at 65 to 75 per cent, strip mills at 60 to 65, highest this year, and tin plate manufacture has advanced 5 points to 80.

Some recession as the inventory and holiday season approaches is considerable inevitable. No weakness, however, is apparent in the underlying market situation, and from present indications the lull will be of short duration.

Automobile production, railroad and structural steel buying all show evidence of expanding. Output of new models last week increased about 5000 units to 98,500, largest for any week since their introduction in October.

A considerable portion of the 115,000 tons of steel required for 10,000 freight cars allocated last week by Pennsylvania railroad is expected to be placed with mills this month. With these awards, the total for new freight cars this year is 19,258, compared with 23,629 in 1934. Union Pacific has ordered two 10-car diesel-electric passenger trains. Wabash receivers have been authorized to purchase 10,000 tons of rails and accessories, while Central of Georgia has closed for 4500 tons of rails.

Topped by 5800 tons for a pier development at Boston, structural shape awards for the week rose to 26,956 tons, highest since September. Eastern oil companies are negotiating for 10,000 tons of plates for tanks, including 3000 tons for Atlantic Refining Co.'s project at Point Breeze, Pa.

The price situation in pig iron and semifinished steel is being affected by the inability of some consumers to take in by Dec. 31 all material for which they had contracted prior to recent advances. It is further complicated by the inability of some pig iron producers to complete deliveries before the end of the quarter.

As finished steel prices did not share in the rise, nonintegrated mills have been bringing strong pressure against the $2 lift in semifinished, and some makers of the latter material may permit shipments in January on orders received up to Dec. 31. This would delay the effective price date until about the middle of February. Similarly, some pig iron placed before the $1 a ton increase may be shipped next year.

Makers of merchant wire products have discarded the quantity differential system which they adopted in August. Former base prices now apply, with less-carload lots up $4 a ton instead of the former $2. Fencing is up $3 to $5 per base column.

Scrap prices continue their strong upward movement, contrary to the usual seasonal trend. At Pittsburgh heavy melting steel has advanced 50 cents to $14 to $14.50. STEEL's scrap composite is up 13 cents to $13.29, topping a seven-weeks steady rise with a figure which is highest since May, 1930. In January, 1933, this index was $6.21. Pennsylvania railroad's offer of 50,000 tons of scrap has not tended to unsettle the market.

Ferromanganese prices have been reduced $10 a ton, and silicomanganese $5, effective Jan. 1, due to recent foreign trade agreements. Connellsville coke prices are off 25 cents a ton.

Chicago district steelworks operations last week declined 4 points to 59 per cent; Pittsburgh 1 to 42; eastern Pennsylvania 2½ to 37; New England 11 to 82. Cleveland was up 2 to 84; Youngstown 2 to 62, and other districts unchanged.

STEEL's iron and steel price composite is up 2 cents to $33.32; the finished steel index unchanged at $53.70.

COMPOSITE MARKET AVERAGES

	Dec. 14	Dec. 7	Nov. 30	One Month Ago Nov., 1935	Three Months Ago Sept., 1935	One Year Ago Dec., 1934	Five Years Ago Dec., 1930
Iron and Steel	$33.32	$33.30	$33.28	$33.15	$32.82	$32.39	$31.69
Finished Steel	53.70	53.70	53.70	53.70	53.70	54.00	49.30
Steelworks Scrap	13.29	13.16	13.12	12.92	12.65	11.02	10.77

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire sheets, plates, shapes, bars, black pipe, rails, alloy steel hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Dec. 14, 1935	Nov. 1935	Sept. 1935	Dec. 1934
Finished Material				
Steel bars, Pittsburgh	1.85c	1.85	1.85	1.80
Steel bars, Chicago	1.90	1.90	1.85	1.85
Steel bars, Philadelphia	2.16	2.16	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.50	2.50	2.50
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.40	2.40	2.40	2.60
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$30.00	29.50	28.00	28.00
Sheet bars, open-hearth, Pitts.	30.00	29.50	28.00	28.00
Billets, open-hearth, Pittsburgh	29.00	28.50	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

	Dec. 14, 1935	Nov. 1935	Sept. 1935	Dec. 1934
Pig Iron				
Bessemer, del. Pitts.	$20.8132	$20.8132	$19.8132	$19.76
Basic, Valley	19.00	19.00	18.00	18.00
Basic, eastern, del. eastern Pa.	20.8132	20.8132	19.8132	19.76
No. 2 fdry., del. Pitts.	20.3132	20.3132	19.3132	19.26
No. 2 fdry., Chicago	19.50	19.50	18.50	18.50
Southern No. 2, Birm.	15.50	14.75	14.50	14.50
Southern No. 2 del. Cincinnati	20.2007	20.2007	19.2007	19.13
No. 2X eastern, del. Phila.	21.6882	21.6882	20.6882	20.63
Malleable, Valley	19.50	19.50	18.50	18.50
Malleable, Chicago	19.50	19.50	18.50	18.50
Lake Sup. charcoal, del. Chi.	25.2528	25.2528	24.2528	24.04
Ferromanganese, del. Pitts.	90.13	90.13	90.13	89.79
Gray forge, del. Pitts.	19.6741	19.6741	18.6741	18.63
Scrap				
Heavy melting steel, Pittsburgh	$14.25	13.65	13.45	12.95
Heavy melt. steel, No. 2, east. Pa.	11.25	11.00	11.25	9.30
Heavy melting steel, Chicago	13.50	13.20	12.55	10.55
Rails for rolling, Chicago	14.75	14.30	13.90	11.65
Railroad steel specialties, Chicago	14.25	13.75	13.75	11.90
Coke				
Connellsville, furnace, ovens	$3.50	3.55	3.25	3.60
Connellsville, foundry, ovens	4.00	4.35	4.00	4.60
Chicago, by-product foundry, del.	9.75	9.75	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; less carloads $4 higher; less carloads fencing $5 over base column.)

Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
*Woven wire fencing (base column, c.l.)	$61.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs and over	1.97½c

Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100	0.15 to 0.25 Mo.		0.50
4600	0.20 to 0.30 Mo. 1.25-1.75 Ni.		1.05
5100	0.80-1.10 Cr.		0.45
5100	Cr. spring		base
6100	bars		1.20
6100	spring		0.70
Cr., Ni., Van.			1.50
Carbon Van.			0.95
9250	carbon base plus extras		

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23½-in.	
Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold-strip, Pitts.	
Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
20-45 lbs.	$28.00
45-50 lbs.	$25.00
50-60 lbs.	$26.00
70-75 lbs.	$24.50
80-90 lbs.	$26.00
100 lbs.	$27.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll, qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.60c
Track bolts, base	3.60c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage and Machine

½ x 6 and smaller	70-10-5 off
Do. larger	70-10 off
Tire bolts	55 off

Plow Bolts

All sizes	70-10 off

Stove Bolts

In packages with nuts attached 72½-10 off; in packages with nuts separate 72½-10-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	65-5 off
Elevator bolts	65-5 off

Nuts

S. A. E. semifinished hex.:

½ to ⅞-inch	60-20-15 off
Do., ½ to 1 inch	60-20-15 off
Do., over 1-inch	60-20-15 off

Hexagon Cap Screws

Milled	80-10-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, expect on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

In.	Blk.	Galv.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots or 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are uoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east. fdy.	—43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$29.00
Philadelphia	34.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	30.00

Slabs

Pitts., Chi., Cleve., Young.	29.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	40.00
Chicago	41.00
Worcester, Mass.	42.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.80c

Coke

Price Per Net Ton

Beehive Ovens

*Connellsville, fur.	$3.50- 3.65
*Connellsville, fdry.	4.00- 4.25
Connel., prem. fdry.	5.50- 5.75
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50
St. Louis, del.	10.00
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del.	9.06
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol		18.00c
Toluol		30.00c
Solvent naphtha		30.00c
Commercial xylol		30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	6.75c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$20.50	$21.00	$20.00	$21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	15.50	15.50	14.50	21.00
Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
Cleveland	19.50	19.50	19.00	20.00
Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	.....	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Everett, Mass.	20.50	21.00	20.00	21.50
Hamilton, O.	19.50	19.50	19.00	.....
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	.....	20.00	.....
Swedeland, Pa.	20.50	21.00	20.00	21.50
Toledo, O.	19.50	19.50	19.00	20.00
Youngstown, O.	19.50	19.50	19.00	20.00
Delivered from Basing Points:				
Akron, O., from Cleveland	20.76	20.76	26.26	21.26
Baltimore from Birmingham	21.08	.....	19.96	.....
Boston from Birmingham	20.62	.....	20.50	.....
Boston from Everett, Mass.	21.00	21.50	20.50	22.00
Boston from Buffalo	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem	22.93	23.43	.....	.....
Brooklyn, N. Y., from Bmghm.	22.50	.....	.....	.....
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	†19.72	.....	19.60	.....
Cincinnati from Hamilton, O.	20.58	20.58	20.08	.....
Cincinnati from Birmingham	20 20	.....	19.20	.....
Cleveland from Birmingham	19.62	.....	19.12	.....
Indianapolis from Hamilton, O.	21.93	21.93	21.43	22.43
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago Toledo or Detroit	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham	21.61	.....	.....	.....
Newark, N. J., from Bethlehem	21.99	22.49	.....	.....
Philadelphia from Birmingham	20.93	.....	20.81	.....
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25

Delivered from Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
St. Louis, northern	20.00	20.00	19.50	.....
St. Louis from Birmingham	†19.62	.....	19.50	.....
St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $24.00, Phila. base, standard and copper bearing, $25.13.

Gray Forge		Charcoal	
Valley furnace	19.00	Lake Superior fur.	$22.00
Pitts. dist. fur.	19.00	Do., del. Chicago	25.25
		Lyles, Tenn.	22.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $22.75; 6.51-7—$23.25; 7-7.50—$23.75; 7.51-8—$24.25; 8-8.50—$24.75; 8.51-9—$25.25; 9-9.50—$25.75. Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional. Each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo.	$45.00
Alabama, Ga., Ky.	$40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$20.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$16.00-17.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsb'gh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carb.	90.00
2% carbon, 95.00; 1%, 105.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro. del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Dec. 7	9.25	9.37½	8.85	51.12½	48.10	4.50	4.35	4.85	*19.00	14.75	35.00
Dec. 9	9.25	9.37½	8.85	50.37½	47.75	4.50	4.35	4.85	*19.00	14.75	35.00
Dec. 10	9.25	9.37½	8.85	50.12½	47.50	4.50	4.35	4.85	*19.00	14.75	35.00
Dec. 11	9.25	9.37½	8.85	49.87½	47.30	4.50	4.35	4.85	*19.00	14.75	35.00
Dec. 12	9.25	9.37½	8.85	49.50	47.37½	4.50	4.35	4.85	*19.00	14.75	35.00
Dec. 13	9.25	9.37½	8.85	49.50	47.37½	4.50	4.35	4.85	*19.00	14.50	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.62½
Copper hot rolled	16.25
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	16.62½
Seamless copper	16.75
Rods	
High yelow brass	13.12½
Copper, hot rolled	13.50
Anodes	
Copper untrimmed	14.00
Wire	
Yellow brass (high)	15.12½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	5.50- 5.75
Cleveland	6.00- 6.25
Chicago	6.00- 6.12½
St. Louis	6.00- 6.25
Heavy Copper and Wire	
New York, No. 1	7.00- 7.25
Chicago, No. 1	7.00- 7.25
Cleveland	6.75- 7.00
St. Louis, No. 1	7.00- 7.37½
Composition Brass Borings	
New York	5.00- 5.25
Light Copper	
New York	5.75- 6.00
Chicago	5.50- 5.75
Cleveland	5.75- 6.00
St. Louis	5.75- 6.00
Light Brass	
Chicago	3.37½-3.62½
Cleveland	3.25- 3.50
St. Louis	3.50- 3.75
Lead	
New York	3.50- 3.75
Cleveland	3.50- 3.75
Chicago	3.37½-3.62½
St. Louis	3.65- 3.75
Zinc	
New York	2.00- 2.25
Cleveland	2.50- 2.75
St. Louis	2.75- 3.00
Aluminum	
Borings, Cleveland	8.50- 9.00
Mixed, cast, Cleve.	13.25-13.50
Mixed, cast, St. L.	13.00-13.50
*Clips, soft, Cleve.	13.50-13.75

SECONDARY METALS

Brass ingot, 85-5-5-5	9.50
Stand. No. 12 alum.	17.00-17.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dock, expt.	9.50- 9.75
Boston, domestic	7.50- 7.75
Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	10.00-10.50
Chicago, No. 1	13.25-13.75
Cleveland, No. 1	12.75-13.25
Cleveland, No. 2	11.75-12.25
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	12.00-12.50
Eastern Pa., No. 2	11.00-11.50
Federal, Ill.	10.00-10.50
Granite City, R. R.	10.50-11.00
Granite City, No. 2	9.25- 9.75
N. Y., deal, No. 2	7.50- 7.75
N. Y., deal. barge	8.50- 8.75
Pitts., No. 1 (R. R.)	14.75-15.25
Pitts., No. 1 (dlr.)	14.00 14.50
Pittsburgh, No. 2	13.00-13.50
St. Louis	9.25- 9.75
Valleys, No. 1	13.50-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.00-10.50
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cleveland	12.25-12.75
Detroit	10.00-10.50
E. Pa., new mat.	11.50-12.00
Pittsburgh	14.25-14.75
St. Louis	7.00- 7.50
Valleys	13.00-13.25

BUNDLED SHEETS

Buffalo	8.00- 8.50
Cincinnati, del.	8.00- 8.50
Cleveland	9.75-10.25
Pittsburgh	13.00-13.50
St. Louis	5.50- 6.05

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati	7.50- 8.00
Detroit	7.50- 8.00
St. Louis	5.00- 5.50

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.50-15.00
Chicago (3 ft.)	15.00-15.50
Chicago (2 ft.)	16.00-16.50
Cincinnati, del.	14.00-14.50
Detroit	13.50-14.00
Pitts., open-hearth, 3 ft. and less	15.75-16.25
St. Louis, 2 ft. & less	14.00-14.50

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	13.25-13.75
Pittsburgh	14.00-14.50
St. Louis	11.50-12.00
Buffalo	11.50-12.00

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	4.75- 5.00
Buffalo	10.25-10.75
Chicago	7.00- 7.50
Cincinnati, dealers	7.50- 8.00
Detroit, net	7.00- 7.50
Eastern Pa.	9.50-10.00
N. Y., deal. fdry.	6.00
St. Louis	7.00- 7.50

COUPLERS, SPRINGS

Buffalo	14.50-15.00
Chicago, springs	14.00-14.50
Eastern Pa.	14.50-15.00
Pittsburgh	16.00-16.50
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	14.00-14.50
St. Louis	12.25-12.75

RAILROAD SPECIALTIES

Chicago	14.00-14.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	14.50-15.00
Cleveland, billet, bloom crops	16.00-16.50
Eastern Pa., crops	15.50-16.00
Pittsburgh, billet, bloom crops	17.00-17.50
Pittsburgh, sheet bar crops	15.75 16.25

FROGS, SWITCHES

Chicago	13.25-13.75
St. Louis, cut	11.50-12.00

SHOVELING STEEL

Chicago	13.25-13.75
Federal, Ill.	9.75-10.25
Granite City, Ill.	8.75- 9.25

RAILROAD WROUGHT

Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.00-10.50
Buffalo, No. 2	11.50-12.00
Chicago, No. 1, net	10.00-10.50
Chicago, No. 2	13.25-13.75
Cincinnati, No. 2	10.50-11.00
Eastern Pa.	12.00-12.50
N. Y., No. 1, deal.	9.50-10.00
St. Louis, No. 1	7.75- 8.25
St. Louis, No. 2	10.50-11.00

SPECIFICATION PIPE

Eastern Pa.	10.50
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.00-10.50
Chicago, No. 1	11.50-12.00
Cinci., No. 1, deal.	7.50- 8.00
Cincinnati, No. 2	4.50- 5.00
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	9.00- 9.50
Valleys, new, No. 1	12.75-13.00

MACHINE TURNINGS

Birmingham	4.00- 4.50
Boston, dealers	3.25- 3.50
Buffalo	5.75- 6.25
Chicago	7.00- 7.50
Cincinnati, dealers	6.00- 6.50
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	7.50- 8.00
New York, dealers	3.50- 3.75
Pittsburgh	9.75-10.25
St. Louis	3.25- 3.75
Valleys	9.00- 9.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.75- 8.25
Cincinnati, dealers	5.50- 6.00
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
Eastern Pa.	6.00- 6.50
New York, dealers	2.00- 2.50
Pittsburgh	8.00- 9.00

CAST IRON BORINGS

Birmingham, plain	4.00- 4.50
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.75- 8.25
Chicago	6.50- 7.00
Cincinnati, dealers	5.50- 6.00
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
E. Pa., chemical	10.00-12.00
New York, dealers	2.00- 2.50
St. Louis	3.75- 4.25

PIPE AND FLUES

Cincinnati, dealers	7.00- 7.50

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	6.00- 6.50
Eastern Pa.	9.00- 9.50
New York, dealers	5.00- 5.25
St. Louis	5.00- 5.50

FORGE FLASHINGS

Boston, dealers	6.25- 6.50
Buffalo	10.50-11.00
Cleveland	11.00-11.50
Detroit	9.00- 9.50
Pittsburgh	13.00-13.50

FORGE SCRAP

Boston, dealers	4.50- 5.00
Chicago, heavy	14.00-14.50
Eastern Pa.	12.25-12.75

ARCH BARS, TRANSOMS

St. Louis	12.25-12.75

AXLE TURNINGS

Boston, dealers	3.75- 4.25
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Eastern Pa.	11.00
St. Louis	8.50- 9.00

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.50-11.00
Buffalo	14.50-15.00
Chicago, net	14.50-15.00
Eastern Pa.	17.00
St. Louis	12.75-13.25

SHAFTING

Boston, ship point.	13.00-13.25
Eastern Pa.	18.50
New York, dealers	13.50-14.00
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	9.00- 9.50
Boston, iron deal.	7.00- 7.75
Buffalo, iron	11.00-11.50
Buffalo, steel	14.50-15.00
Chicago, iron	13.00-13.50
Chicago, rolled steel	14.00-14.50
Cincinnati, iron	10.50-11.00
Eastern Pa., iron	13.50
Eastern Pa., steel	15.00-15.50
Pittsburgh, iron	14.00-14.50
Pittsburgh, steel	15.75-16.25
St. Louis, iron	10.25-10.75
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 1 mach.	9.00- 9.25
Boston, No. 2	8.25- 8.50
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	11.75-12.25
Buffalo, mach.	13.00-13.50
Chicago, agri. net	10.00-10.50
Chicago, auto	11.00-11.50
Chicago, mach. net	12.00-12.50
Chicago, railr'd net	10.50-11.00
Cinci., mach. cup	10.50-11.00
Cleveland, cupola	12.75-13.25
Detroit, net	11.50-12.00
Eastern Pa., cupola	12.50-13.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	13.75-14.25
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	10.75-11.25
St. L., No. 1 mach.	12.50-13.00

HEAVY CAST

Boston, del.	6.75- 7.00
Buffalo, break.	10.50-11.00
Cleveland, break	10.50-11.00
Detroit, No. 1, mach. net	12.00-12.50
Detroit, break.	9.00- 9.50
Detroit, auto net	11.50-12.00
Eastern Pa.	12.00-12.50
N. Y., break. deal.	9.00- 9.50
Pittsburgh	12.50-13.00

MALLEABLE

Birmingham, R. R.	11.50-12.50
Boston, consum.	13.50-14.50
Buffalo	14.50-15.00
Chicago, R. R.	15.75-16.25
Cincinnati, agri. del.	11.50-12.00
Cleveland, rail	16.00-16.50
Detroit, auto net	13.00-13.50
Pittsburgh, rail	16.50-17.00
St. Louis, R. R.	13.75-14.25
Eastern Pa., R. R.	15.00-15.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	14.50-15.00
Eastern Pa.	13.00-14.00
New York, dealer	10.50-11.00
St. Louis	13.50-14.00

LOCOMOTIVE TIRES

Chicago (cut)	14.00-14.50
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	14.50-15.00
Chicago	15.00-15.50
Eastern Pa.	16.00-16.50
Pittsburgh (heavy)	16.00-16.50
Pittsburgh (light)	15.50 16.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	3.00c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.36c
Chicago (j)	3.00c
Cincinnati	3.22c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.35c
New York‡(d)	3.31c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.70c
San Francisco	3.50c
Seattle	3.70c
St. Louis	3.25c
St. Paul	3.25c-3.40c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.36c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.22c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.36c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.46c
Philadelphia*	2.98c
Pittsburgh (h)	3.15c
Portland (i)	3.70c
San Francisco	3.50c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
PLATES	
Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh (h)	3.15c
Portland	3.55c
San Francisco	3.50c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh (h)	2.95c
San Francisco	3.60c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.60c
Boston (g)	2.95c
Buffalo	3.25c
Chattanooga	4.16c
Chicago	3.85c
Cincinnati	4.02c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.25c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.40c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c
BANDS	
Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York (d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh (h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c
COLD FIN. STEEL	
Baltimore (c)	3.58c
Boston	3.75c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang. (f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran. (f) (d)	5.80c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.87c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c

TOOLS STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-10
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 inches; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 12

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.37 3 2 6	$14.56	1 16 0
Basic bessemer	15.37 3 2 6*	12.95	1 12 0
Hematite, Phos. .03-.05	16.00 3 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$27.06 5 10 0	$19.02	2 7 0
Wire rods, No .5 gage	41.82 8 10 0	36.44	4 10 0
FINISHED STEEL			
Standard rails	$40.59 8 5 0	$44.53	5 10 0
Merchant bars	1.64c 7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.64c 7 10 0	1.14c	3 1 6
Plates, †¾ in. or 5 mm.	1.77c 8 1 3	1.56c	4 5 0
Sheets, black, 24 gage or 0.5 mm	2.08c 9 10 0	2.13c	5 16 0††
Sheets, gal., 24 gage, corr.	2.51c 11 10 0	2.19c	6 0 0
Bands and strips	1.86c 8 10 0	1.46c	4 0 0
Plain wire, base	2.03c 9 5 0	1.96c	5 7 6
Galvanized wire, base	2.36c 10 15 0	2.29c to 2.33c	6 5 6 to 6 7 6
Wire nails, base	2.63c 12 0 0	2.11c	5 15 0
Tin plate, box 108 lbs.	$4.62 0 18 9	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$17.22	3 10 0(a)	$17.13	260	$12.85	385	$25.36 63
Basic bessemer pig iron	17.22	3 10 0(a)	12.52	190	11.83	350	27.97 (b) 69.50
Furnace coke	4.56	0 18 6	6.26	95	3.89	115	7.65 19
Billets	27.06	5 10 0	28.34	430	18.25	540	38.85 96.50
Standard rails	1.81c	8 5 0	2.08c	694	1.65c	1,100	2.42c 132
Merchant bars	1.90c	8 12 0	1.68c	560	90c	600	2.01c 110
Structural shapes	1.92c	8 15 0	1.65c	550	90c	600	1.97c 107.50
Plates, †¼-in. or 5 mm.	1.99c	9 1 3	2.10c	700	1.05c	700	2.32c 127
Sheets, black	2.47c	11 5 0§	1.69c	575‡	1.24c	825‡	2.64c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	2.91c	13 5 0	3.00c	1,000	2.25c	1,500	6.77c 370
Plain wire	2.03c	9 5 0	2.64c	900	1.73c	1,150	3.17c 173
Bands and strips	2.05c	9 7 0	1.95c	650	1.26c	840	2.32c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.25 per cent over paper sterling.

Bars

Bar Prices, Page 60

Pittsburgh — Bar specifications have declined for the second consecutive week because of the slowing in demand from many miscellaneous sources. In general, specifications from the automotive industry are steady and a slight gain is in evidence for bars for railroad repair work. The market is generally firm at 1.85c, base, Pittsburgh, for 5 to 25-ton lots.

Cleveland — Specifications for steel bars were moderately lighter than in the preceding week, as consumers apparently are endeavoring to hold stocks to a minimum for inventory. Some of the tonnages booked for delivery this month when a price rise was anticipated have been re-scheduled for January, and in a few instances, reduced slightly. The principal demand still is coming from automobile forge shops. Shovel manufacturers made some liberal purchases during the week.

Chicago—While steel bar demand is fairly well maintained, some seasonal slackening is apparent in specifications from smaller users. The automotive and farm implement industries continue to lead and fairly heavy shipments are being taken by cold bar finishers and forgers.

Philadelphia — Commercial steel bar tonnage has been declining since the first of the month, with sellers generally looking for little improvement before the early part of next year. Prices are steady.

Plates

Plate Prices, Page 60

Pittsburgh—Pittsburgh barge shops have before them the largest single prospective order they have figured on in many years. A financial group located outside of Pittsburgh, has been surveying the barge market as an investment with the thought in mind of purchasing 100 standard steel coal barges, which would require at least 15,000 tons of steel plates and shapes, and chartering them to various concerns as needed. Such an individual order would be larger than all of the barge business booked by five leading Pittsburgh barge shops in all of 1935. Meanwhile in the more active state, Campbell Transportation Co., Pittsburgh, apparently closed its inquiry Dec. 13 for eight standard coal barges. Bidding $66,000, Treadwell Construction Co., Midland, Pa., has been awarded tow 15-ton derrick boats, each with 85-foot steel booms, for the Huntington, W. Va., army engineers.

Cleveland — The market generally is quiet, although tank fabricators continue to place carload lots occasionally. American Rolling Mill Co., Middletown, O., has been awarded a Cleveland city pipe contract requiring 825 tons of ⅜-inch plate spirally welded in 30-inch diameter.

Chicago—Plates continue to move at a slightly improved rate to fabricators and to railroad car shops. Some material has been ordered by the Illinois Central railroad for its extensive car repair program, and heavier demand from other roads is in prospect for similar work. Increased plate consumption is indicated in rising activity of structural fabricators.

New York—Plate tonnage is expected to be increased before the end of the year by award of material for the Pennsylvania carbuilding program. About 10,000 tons of oil company tanks in four projects, principally for shipment to Texas are active. About 1000 tons of plates has been placed with an eastern mill for tanks for the Pan American Petroleum & Transport Co., New York, for a Texas plant. Formal contracts are expected shortly on three ferries requiring 1500 tons of steel each for the city of New York.

Philadelphia—While plate specifications continue to decline, due in no small measure undoubtedly to the approaching holiday and inventory season, there are prospects that releases for the Pennsylvania car tonnage may cushion further reduction. It is expected that the Pennsylvania, at least on the equipment it plans to build in its own shops, will start issuing releases before the end of the year. Talk continues to be heard of impending tanker construction for various oil companies, but apart from two tankers for the Socony-Vacuum Oil Co. Inc., New York, involving 8000 to 10,000 tons of steel, little definite has yet developed. It is believed, however, that several tankers will become active within the next few weeks. While reports of shading in some quarters persist, the general market is unchanged.

Possibly the largest tank plate tonnage pending here involves 3000 tons for the plant of the Atlantic Refining Co. at Point Breeze, Pa.

Birmingham, Ala.—Demand for tanks of various sizes has been much better recently for waterworks projects financed by the government. Chicago Bridge & Iron Works, Birmingham, Ala., will furnish a 50,000-gallon tank for the waterworks system at Woodbury, Tenn.

Seattle—Tacoma opened bids for 6062 feet of 46 and 54-inch water pipe for another unit of the Green river gravity system. Steel interests have no hope of obtaining the job as the city allows concrete at 33 1/3 per cent differential, claiming concrete life is 60 years against steel's 45 years. Standard Oil Co. is planning construction of a 25,000-barrel storage tank and enlargement of plant facilities at Aberdeen, Wash. Corrugated metal sheathing is specified in port extension projects at The Dalles, Oreg., and Olympia, Wash.

Contracts Placed

825 tons, ¾-inch for 30-inch spiral welded pipe, East 121st street water line, Cleveland, to American Rolling Mill Co., Middletown, O.; through A. L. Connelly Co., Cleveland.

Contracts Pending

Unstated tonnage, 500,000-gallon steel elevated tank, W. H. Weaver, city engineer, Decatur, Ga., Chicago Bridge & Iron Works, Chicago, low bidder.

Unstated tonnage, 300,000-gallon steel storage standpipe, Rocky Mount, Franklin county, Virginia, Richmond Engineering Co., Richmond, Va., low bidder.

Unstated tonnage, standpipe and elevated tank, board of water commissioners, Concord, N. H., to Chicago Bridge & Iron Works, Chicago.

1225 tons, sewer pipe, New Brunswick, N. J., to Alco Products Corp., New York.

Unstated tonnage, 300,000-gallon standpipe, board of supervisors, Amherst, Va., to Chicago Bridge & Iron Works, Chicago.

Unstated tonnage, 100,000-gallon flat bottom water tank at Craigville, Va., awarded through the county board of supervisors, Staunton, Va., to the Lancaster Iron Works, Lancaster, Pa.

Sheets

Sheet Prices, Page 60

Pittsburgh — The earliest most producers are able to give delivery on full-finished sheets is mid-January. A surprising degree of strength also continues in the common finishes. At present common black and galvanized production are 75 and 60-65 per cent, respectively. Jobbing mills are steady at about 50 per cent. Prices are firm and there have been some first-quarter tonnages closed at the full market.

Cleveland — A strong demand prevails for sheets, mainly automotive, with specifications in hand for the latter material for January and part of February, and mills here and in an adjacent lake district operating near capacity. Orders from manufacturers of household utilities are holding up. Prices here are firm.

Chicago—Contrary to expectations, sheet demand is well maintained and in some directions is heavier. Automotive consumers are slightly less active in sheet orders, though relatively heavy lots still are moving to that industry. Elsewhere the active rate of consumption is offsetting con-

sumers' desires to restrict inventories during the balance of this month. Some interest is being shown in first quarter contracting, though bookings for that period as yet are not heavy.

New York — While sheet tonnage is shrinking, as may be expected in view of the approaching holiday and inventory season, there is nevertheless a much better volume moving than a year ago this time, and sellers are looking forward to a good first quarter business. Prices are steady.

Philadelphia — Sheet tonnage is declining as the holiday and inventory season approaches. A feature, however, is continued good demand from stovemakers. Radio tonnage has dropped sharply. The Apollo Steel Co., Apollo, Pa., has just been awarded a carload of zinc-coated sheets for road signs for the state of Pennsylvania. New Jersey opened bids Dec. 10 on a substantial tonnage of automobile license tags. The H. J. Heinz Co., this city, has received contract for fabricating doors and hatches for eight destroyers to be built by the navy and requiring more than 100 tons of stainless steel.

Buffalo—District sheet mills continue to operate at 90 per cent and will take only the shortest possible holidays. Heavy bookings are on hand.

Cincinnati—A moderate decline in new purchasing during the past week fails to affect production schedules, near 100 per cent, of district sheet mills. The recession in ordering from the high level of recent weeks seems to indicate desire on part of purchasers to clarify first quarter needs before making too heavy forward commitments.

St. Louis — Some decline in specifications has been noted since prices were extended. The movement, however, continues in substantial volume, and thus far in December is considerably ahead of the comparable periods in recent years.

Transportation

Track Material Prices, Page 61

Award of 10,000 freight cars by the Pennsylvania is by far the most important event in the railroad market at the moment. The road's own shops will construct 6000 and the remaining 4000 have been distributed to outside shops, as given in detail below. It is estimated new steel requirements for this program will be 115,000 tons, some reclaimed parts being used.

The cars to be built in the company's own shops comprise 3000 automobile cars, 2000 mill type gondolas of an entirely new design, it is said, 700 standard steel box cars and 300 hopper cars, to be built especially for heavy cement and similar bulk commodities.

The automobile car program will include 2000 fifty-ton automobile box, of which 300 will be equipped with automobile loading devices. These will be 40 feet, 6 inches long, 10 feet, 5 inches high and 9 feet, 2 inches wide, with double side doors. There also will be 1000 fifty-ton auto cars, 50 feet, 6 inches in length, with double side doors, especially designed, not only for automobiles but for automobile accessories and other materials light in weight, but requiring movement on an especially long car body. End doors will be provided for the 300 of these cars to meet special loading and unloading requirements.

The 4700 box bars will be 50 tons capacity, 40 feet, 6 inches long, 10 feet high and 9 feet, 2 inches wide, with single side doors. The 2000 mill type gondolas have been especially designed to handle structural shapes, pipe and other mill products. They will be 52 feet long, 9 feet, 6 inches wide, side 3 feet, 6 inches, equipped with drop end doors and will be of 70 tons capacity.

Union Pacific railroad has placed two streamlined passenger trains with Pullman-Standard Car Mfg. Co., Chicago, bringing this road's fleet of such trains to six. The new units each will have ten cars, including Pullmans and coaches and will be powered by 2400-horsepower diesel motors. The diesel electric power plants will be furnished by the Electro-Motive Corp. Cor-Ten steel will be used in building the power cars, while the principal structural material of the other cars will be aluminum alloy. Trucks and couplings will be steel.

New York Central will build in its own shops at Indianapolis a seven-car streamlined train powered by a Pacific type locomotive to be built at its shops at West Albany, N. Y. It will be placed in service between Cleveland and Detroit.

Federal court authorization has been granted to the Wabash to buy 10,000 tons of rails and sufficient track fastenings. Central of Georgia has placed 4500 tons of rails with the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., 2500 tons to be delivered in December. Norfolk & Western has distributed 3500 kegs of spikes.

Domestic freight car awards in November, 100 cars, bring the total for the first 11 months up to 9258 cars, compared with 23,719 in the same period of 1934. With the possibility that the Pennsylvania railroad will distribute orders this month for 10,000 freight cars, of which most will undoubtedly go to its own shops, December should be the best month of the year, surpassing by almost 100 per cent, if not more, the June total of 5151, the largest for the year to date. Placing of the Pennsylvania business this month would bring the year's total up to within a few thousand of last year. Comparisons follow:

	1935	1934	1933	1932
Jan.	24	152	3	159
Feb.	806	19,725	0	35
March	0	30	5	105
April	350	800	50	0
May	2	717	8	60
June	5,151	1,835	500	0
July	500	19	306	25
Aug.	200	105	202	5
Sept.	875	7	23	1,298
Oct.	1,250	75	514	0
Nov.	100	254	533	2
11 Mo.	9,258	23,719	2,144	1,749
Dec.		110	316	50
Total		23,829	2,460	1,739

Car Orders Placed

Pennsylvania railroad, 10,000 freight cars; 6000 for own shops and 4000 divided among outside car builders as follows: Pressed Steel Car Co., McKees Rocks, Pa., 1000; American Car & Foundry Co., Berwick, Pa., 800; Pullman Standard Car Mfg. Co., Butler, Pa., 700; Bethlehem Steel Co., Johnstown, Pa., 600; General American Car Co., East Chicago, Ind., 400; Greenville Steel Car Co., Greenville, Pa., 250, and Ralston Steel Car Co., Columbus, O., 250.

Union Pacific, two ten-car diesel-electric passenger trains to Pullman Standard Car Mfg. Co., Chicago. Electro-Motive Corp., Chicago, to furnish 2400-horsepower power units.

New York Central, seven-car streamlined train for operation between Cleveland and Detroit, construction in company shops at Indianapolis; the train will not be articulated, it is said.

Locomotives Placed

Chicago, Burlington & Quincy, diesel-electric locomotive, 900 horsepower, to Cummins Engine Co., Columbus, Ind.; electrical equipment to be supplied by the General Electric Co., Schenectady, N. Y.

Chicago, Milwaukee, St. Paul & Pacific, one Hiawatha type locomotive to American Locomotive Co., New York.

New York Central, Pacific type locomotives, to own shops at West Albany, N. Y.

Rail Orders Placed

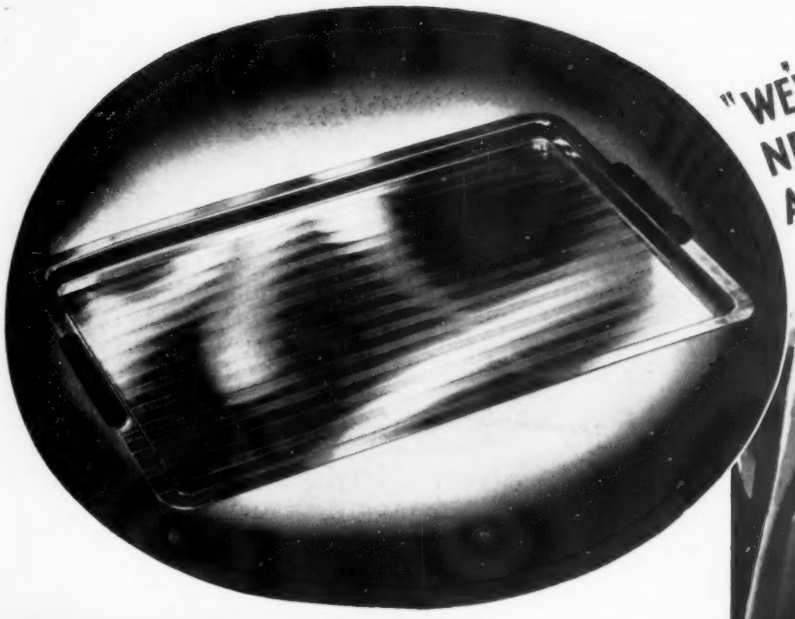
Central of Georgia, 4500 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; 2500 tons for December delivery.

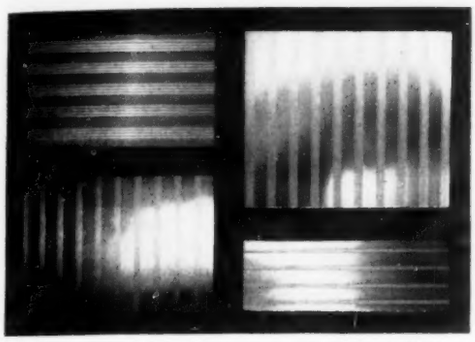
Car Orders Pending

Paulista Railway of Brazil, Sao Paulo, Brazil, 400 all-steel box cars, approximately 45 tons capacity each; 10 first class passenger coaches; bids asked; this equipment is in addition to 200 box cars noted as pending last month.

Rail Orders Pending

Wabash, 10,000 tons, for 1936; authorized by federal court (in addition to 1790 tons noted Dec. 9); also necessary fastenings.





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Pipe

Pipe Prices, Page 61

Pittsburgh—Some opposition has developed by nonintegrated pipe interests on paying the $2 a ton increase in skelp, but producers have taken the stand that they will adhere to this price, in order to rid the market of certain irregularities on many grades of pipe, especially the small diameters of standard grades. Small orders predominate, and no sizable projects are in the near-contract stage.

Chicago—Cast pipe orders continue to improve, though most bookings are in small lots. Pending work is accumulating as a result of PWA and WPA projects on which bids have been taken, though awarding of contracts for some of these will be deferred for a number of weeks. Prices are steady.

Boston—Cast pipe sellers report a greater number of active projects this month than anticipated earlier in the fall. Much of this activity is attributed to government-financed operations which had to be started by the middle of this month.

New York—Approximately 1000 tons of cast pipe and fittings is pending for Ocean Gate, N. J., with Karlson & Reed, Hicksville, Long Island, N. Y., low. American Cast Iron Pipe Co., Birmingham, Ala., is reported low bidder on cast pipe for Charlestown, S. C.

Philadelphia—Resale market is becoming highly unsettled, with jobbers from New York participating in the sharp competition which now prevails. New York jobbers are also said to be active in the Baltimore district.

Washington—L. R. Flori Co., St. Louis, has been awarded the contract at $110,232.84 for furnishing 3,900,000 feet of 1-inch steel pipe to be used in artificially cooling the concrete in Grand Coulee dam. It has been announced that the successful bid, while lowest of several submitted, was entered identically by the Laclede Tube Co. and the Flori company, a jobber, and the final decision as to which was to receive the contract was made by lot.

Seattle—Several important cast iron awards are pending. Additional bids were opened this week, but in some instances figures exceeded estimates. Port Orchard, Wash., is considering asking bids for 260 tons of 4, 6 and 8-inch cast pipe, also valves and accessories.

Cast Pipe Pending

1000 tons, with fittings, borough engineer, Ocean Gate, N. J.; Karlston & Reed, Hicksville, Long Island, N. Y., low.

705 tons, 4 to 10 inch, Oakridge, Oreg.; D. P. Slater, Salem, low.

460 tons, 18 inch, Wenatchee, Wash.; Washington Corrugated Culvert Co.; Wenatchee, general contractor.

260 tons, 4, 6 and 8 inch, Port Orchard, Wash.; D. Coluccion, Seattle, low.

240 tons, 16 inch, Chehalis, Wash.; Frank J. Parker, Chehalis, low.

Unstated tonnage, board of water supply, Charleston, S. C.; American Cast Iron Pipe Co., Birmingham, Ala., low.

Unstated tonnage, sewer section, Newton, Mass.; V. Barletta, Roslindale, Mass., low.

Cast Pipe Placed

549 tons, board of supervisors, Amherst, Va., to Glamorgan Pipe & Foundry Co., Lynchburg, Va.

Strip Steel

Strip Prices, Page 61

Pittsburgh—Since many buyers of strip in narrow widths and thin gages had been specifying on a skelp card where price of 1.70c net applied, the adoption of width and thickness extras on skelp will be of competitive advantage to strip producers, who have been charging 1.85c, f.o.b., Pittsburgh, plus size extras, for some time. Working from three to four weeks behind on deliveries, strip mill operations are now at the highest point for this year, finding hot-rolled at 60 per cent of theoretical capacity and cold-rolled, 65 per cent. The market is fairly firm at 1.85c, Pittsburgh, on hot-rolled and 2.60c, Pittsburgh or Cleveland, on cold-rolled strip. Most accounts are paying this price in full, but there are several irregularities which are well known in the Detroit district.

Cleveland—Automobile partsmakers are being pressed for delivery, and in turn are urging shipments from mills. Mill specifications indicate heavy shipments for the remainder of this month and January.

Chicago—Strip demand is holding up well. Consumption is well maintained and specifications lately have shown little decrease. Automotive orders are slightly less active but shipments remain unusually heavy for December. Some forward buying for January delivery is being done.

New York—Movement of strip is substantially less than a month ago, as manufacturers of novelties for the holiday trade have now virtually completed their season; however, there is a better volume than usual at this time of year for the automobile accessory trade.

Philadelphia—Strip tonnage is lagging here, with a reduction in radio requirements particularly noticeable. Prices are unchanged.

Wire

Wire Prices, Page 61

Pittsburgh—A leading Pittsburgh producer of wire and wire products advises the trade of unchanged base prices on nails, staples, galvanized and annealed fence wire but abolition of the entire quantity differential systems, effective Dec. 12. Former base prices will apply for straight or mixed carloads, with less carloads now $4 per ton higher, instead of the former $2 per ton extra. Fencing is advanced $3 per column to $61, Pittsburgh and Cleveland, for straight or mixed carloads, with less carloads taking an extra of $5.

Cleveland — Orders for manufacturers' wire are holding up exceptionally well for this time of the year. Jobbers' requirements are down slightly. Contracts are being closed for first quarter at unchanged prices.

Chicago—While some decrease is apparent in wire specifications, demand is relatively heavy. Jobbers in some cases are restricting buying for inventory-taking purposes, and stocks of consumers are being held down for the same reason. In general consumption of manufacturers' wire is expected next month, along with heavier purchases of merchant products. First quarter contracting is only moderately active.

Philadelphia—Demand for manufacturers' and agricultural wire is showing further decline. Sellers generally, however, look for a better market during first quarter.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 61

First quarter contracts for bolts, nuts and rivets are being prepared for early delivery. These incorporate the higher prices announced recently, which increase is stimulating specifications against lower price commitments. Jobbers are adding only moderately to stocks, however, the period of the year discouraging large accumulations. Railroad demand is moderately active, while requirements of farm implement manufacturers are well maintained. Rivet prices are unchanged at 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago, for structural sizes and 70 and 5 off list for small rivets.

Quicksilver

New York — Quicksilver prices are firm at quoted levels but the market generally continues quiet, with available supplies limited. Prices range from $75 to $77, a virgin flask, depending on quantity.

—The Market Week—

Shapes

Structural Shape Prices, Page 60

Boston—For the commonwealth pier, Boston, 5800 tons of steel, including shapes and piling, has been awarded to the United States Steel Corp.' subsidiaries.

Public work comprises the bulk of pending tonnage. As general contract bids went in on a number of projects within the past several days the outlook for at least a moderate amount of buying over the remainder of this month is promising.

Chicago—Operations of structural fabricators are increasing, with a similar trend noted in specifications for plain material. Inquiries for fabricated steel are stimulated by the rushed activity in launching public projects. Plans have yet to be received for most of the grade crossing eliminations for this state, the largest one now pending being an overhead crossing on Cermak road here, involving 1000 tons. Southern Pacific railroad has ordered 1525 tons of beam and girder spans.

Pittsburgh — New work in the Pittsburgh district includes a number of schools, aggregating about 410 tons. About 30 schools in the western Pennsylvania area now are listed for inquiry. Pittsburgh Bridge & Iron Co., Rochester, Pa., has taken a 240-ton state highway bridge at Baden, Pa., and a 200-ton plant extension at Monaca, Pa., for Pittsburgh Tube Co. Plain structural material is steady at 1.80c, base, Pittsburgh.

Cleveland — The market is more active, principally for public works projects. Tonnages are relatively small. General contracts have been awarded for Toledo, O., school houses, requiring about 800 tons of shapes, and bids went in Dec. 12 on Cleveland school houses requiring 700 tons. A few small industrial awards were made during the week.

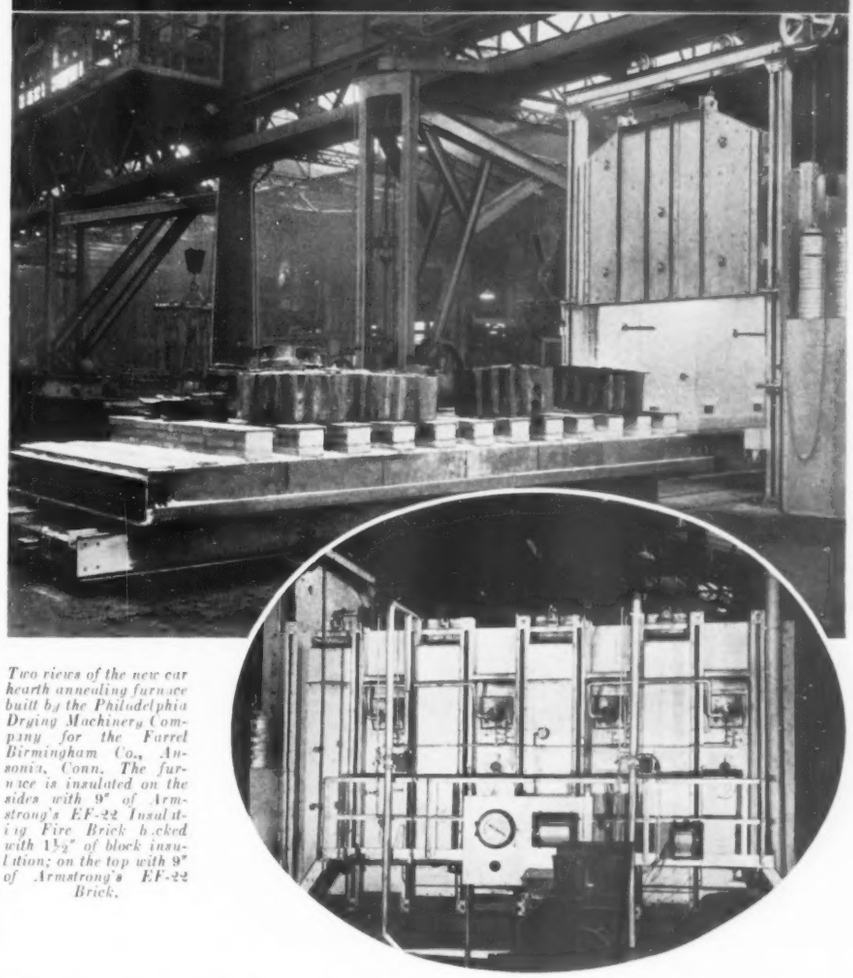
New York—The structural shape market is more active, with new bids expected shortly for the vehicular highway between 46th and

Shape Awards Compared

	Tons
Week ended Dec. 14	26,936
Week ended Dec. 7	23,335
Week ended Nov. 30	21,229
This week, 1934	9,408
Weekly average, 1934	16,284
Weekly average, 1935	16,758
Weekly average, November	18,746
Total to date, 1934	841,800
Total to date, 1935	854,440

Multiple Heat Control

PERMITS GREATER EFFICIENCY AT LOWER COST IN THIS NEW CAR HEARTH FURNACE



Two views of the new car hearth annealing furnace built by the Philadelphia Drying Machinery Company for the Farrel Birmingham Co., Ansonia, Conn. The furnace is insulated on the sides with 9" of Armstrong's EF-22 Insulating Fire Brick backed with 1½" of block insulation; on the top with 9" of Armstrong's EF-22 Brick.

THIS car hearth annealing furnace, built by the Philadelphia Drying Machinery Company, offers a new "high" for economy in the construction and operation of this type furnace.

Multiple small burners permit accurate zone control of temperatures. Armstrong's EF-22 Insulating Fire Brick construction gives maximum heat reflection.

The elimination of a refractory lining made possible thinner walls —lighter steel and less brick work. The high insulating qualities of this brick provide a sharper, quicker furnace; more uniform temperature throughout the furnace; lower fuel costs; and low heat storage.

Armstrong's EF-22 Insulating Fire Brick is designed for direct exposure up to 2200° F., EF-26 for similar use up to 2600° F. Insulating bricks in the Armstrong Line are: N-16 for temperatures up to 1600° F. behind the refractory; N-20 for temperatures up to 2000° F. behind the refractory; and A-25 for temperatures up to 2500° F. behind the refractory.

For concise facts get new folder "Armstrong's High Temperature Insulation . . ." Armstrong Cork Products Co., Building Materials Division, 985 Concord St., Lancaster, Penna.

Armstrong's

HIGH TEMPERATURE INSULATION

59th streets, New York, requiring 13,000 tons. Several other projects to take substantial tonnages are pending.

Philadelphia — A large number of projects, involving principally government financed work, are pending in the local structural market. Contractors' bids on many of these were opened last week, with the probability that some fairly good tonnages will be awarded fabricating shops in the near future. Possibly the largest private job, on which bids have been recently opened, is the 1000-ton plant addition for the Ludlow Mfg. Co., Edge Moor, Del. Shape prices are unchanged.

Cincinnati — Activity among fabricators is attributed largely to governmental aid on varied projects. A Kentucky state highway department grade elimination in Jefferson county will require 2500 tons of reinforcing bars, 700 tons of piling, and 760 tons of structural steel.

Birmingham, Ala. — Structural steel fabricating shops are going into 1936 with fairly well balanced backlogs, and more business in sight. Ingalls Iron Works Co. here, will supply about 1200 tons for crest gates at lock No. 17 on the Black Warrior river, this district.

Seattle—The week's awards aggregated 2500 tons. Important tonnages are up for figures, and the market is showing the greatest activity in several years. Contracts placed include 1600 tons, First avenue south state bridge, Seattle, to Wallace Bridge & Structural Steel Co., Seattle.

Shape Contracts Placed

5800 tons, commonwealth pier, Boston, to United States Steel Corp. subsidiaries.

4350 tons, New York Central's West Seventy-ninth street elimination, New York, to American Bridge Co., Pittsburgh.

1600 tons, First avenue south crossing, Seattle, to Wallace Bridge & Structural Steel Co., Seattle; P. P. Gjarde, Seattle, general contractor.

1300 tons, building extension, Wheeling Steel Corp., at Steubenville, O., to Riverside Steel Co., Martins Ferry, O.

1250 tons, Black Warrior dam, No. 17, Alabama, to Ingalls Iron Works Co., Birmingham, Ala.

1200 tons, court house and jail, Oklahoma City, Okla., to Capitol Steel & Iron Co., Oklahoma City.

675 tons, United States repository, Ft. Knox, Ky., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

550 tons, for University of Cincinnati building, Cincinnati, to Ingalls Iron Works Co., Birmingham, Ala.

525 tons, beam spans, Southern Pacific railroad, Houston, Tex., to Virginia Bridge & Iron Co., Roanoke, Va.

480 tons, Rhode Island School of Design, Providence, R. I., to James H. Tower Iron Works, Providence, R. I.

465 tons, Transportation building,

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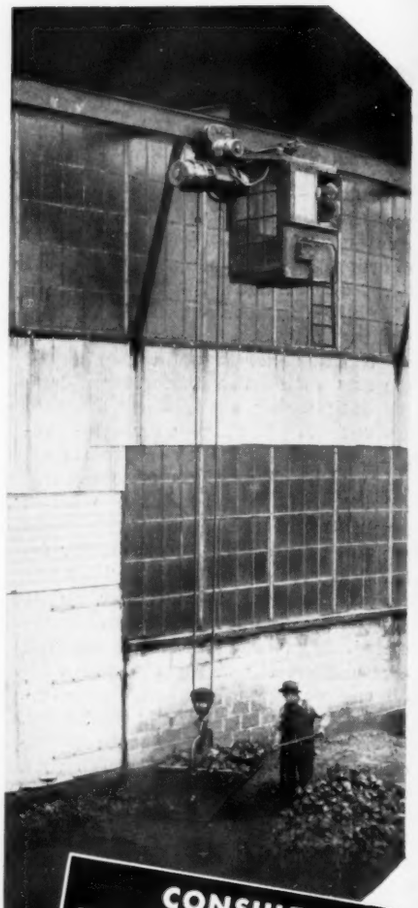

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P&H MILWAUKEE ELECTRIC HOISTS

Dallas, Tex., to Austin Bros., that city.

450 tons, sewage disposal plant, Chicago, to McClintic-Marshall Corp., Bethlehem, Pa.

440 tons, three state highway bridges, Arkansas, to Kansas City Structural Steel Co., Kansas City, Mo.

375 tons, bridge, Cynthiana, Ky., to Vincennes Steel Co., Vincennes, Ind.

375 tons, bridge, Braxton, Ga., to Vincennes Steel Co., Vincennes, Ind.

315 tons, state highway bridge, Battle Creek, Mich., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, public school No. 18, Paterson, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

300 tons, power plant, for Vineland, N. J., to Frank M. Weaver & Co., Philadelphia.

300 tons, plant addition, Johns-Manville Corp., Waukegan, Ill., to American Bridge Co., Pittsburgh.

300 tons, distillery at Lawrenceburg, Ind., to Ingalls Iron Works Co., Birmingham, Ala.

290 tons, grandstand, fairgrounds, Minneapolis, to St. Paul Foundry Co., St. Paul.

275 tons, bridge, Newburyport, Mass., to Boston Bridge Works Inc., Cambridge, Mass.

275 tons, postoffice, Waco, Tex., to Austin Bros., Dallas, Tex.

250 tons, bridge and towers for Seattle light department, to Wallace Bridge & Structural Steel Co., Seattle.

250 tons, building, Palmerton, Pa., for New Jersey Zinc Co., to Lehigh Structural Steel Co., Allentown, Pa.

240 tons, state highway bridge, Terre Haute, Ind., to Central States Bridge & Structural Co., Indianapolis.

240 tons, state highway bridge, Baden, Pa., to Pittsburgh Bridge & Iron Co., Rochester, Pa.

225 tons, addition to Bellevue hospital, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.

225 tons, state highway bridge, Flint, Mich., to American Bridge Co., Pittsburgh.

215 tons, state hospital, Jamestown, N. Dak., to Crown Iron Works Co., Minneapolis.

200 tons, plant extension for Pittsburgh Tube Co., Monaca, Pa., to Pittsburgh Bridge & Iron Co., Rochester, Pa.

190 tons, bridge, Endicott, N. Y., for Erie railroad, to American Bridge Co., Pittsburgh.

180 tons, bridge, WPGH-182-1, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

175 tons, state undercrossing Nisqually river, Washington, to Wallace Bridge & Structural Steel Co., Seattle; C. L. Creelman, Seattle, general contractor.

170 tons, state bridge, Weymouth, Mass., to Boston Bridge Works Inc., Cambridge, Mass.

160 tons, Long Hill road bridge, Groton, Conn., to Harris Structural Steel Co., 419 Fourth avenue, New York.

160 tons, postoffice, Chester, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

155 tons, college gymnasium, Amherst, Mass., to Haarmann Steel Co., Holyoke, Mass.

150 tons, bridge, WPH-264 No. 2, Cass county, Texas, to Mosher Steel & Machinery Co., Dallas, Tex.

140 tons, flooring, police headquarters, Buffalo, to Buffalo Structural Steel Co., Buffalo.

140 tons, state highway bridge, Dearborn, Mich., to American Bridge Co., Pittsburgh.

140 tons, laboratory addition for the du Pont interests, Carney's Point, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.

138 tons, Daisy street and Haverhill street bridges, Lawrence, Mass., through Continental Construction Co. to Boston Bridge Works Inc., Cambridge, Mass.

135 tons, buildings, Dairymen's Milk Co., Pittsburgh, to Levinson Steel Co., Pittsburgh.

115 tons, bridge, WPGH-190-F, De Sota county, Mississippi, Pidgeon-Thomas Iron Co. Inc., Memphis, Tenn.

115 tons, building, Columbia Chemical Co., Barberton, O., to Pittsburgh Bridge & Iron Works, Rochester, Pa.

113 tons, bridge, Pleasant Hill, O., in Muskingum conservancy district, to Fort Pitt Bridge Works, Pittsburgh; through United States engineer, Zanesville, O.

110 tons, flooring, International Milling Co., Buffalo, to Buffalo Structural Steel Co., Buffalo.

110 tons, public library garage, Cleveland, to Kilroy Structural Steel Co., Cleveland.

105 tons, structures at Seattle and Wallace, Idaho, to Isaacson Iron Works, Seattle.

100 tons, Seattle water department project and miscellaneous, to Steel Fabricators Inc., Seattle.

100 tons, Ediz Hook coast guard barracks, Washington, to Isaacson Iron Works, Seattle.

Unstated tonnage, pier development.

Do Your Draw Benches Have These Features?

FULLY AUTOMATIC TONGS PLUS HIGH SPEED RETURN—POSITIVE BUT SIMPLE UNLOADING DEVICE — QUIET RUNNING DRIVE — AND HEAT TREATED NICKEL CHROME STEEL CHAIN.

This 20,000 pound bench was built for drawing copper tubing in long lengths. The overall length of the bench, without motor or extension, is about 190 feet. The bed consists of eight sections, with a leg support at each joint. The extension shown is the rod type, 75 feet long, in seven sections. Length of draw, 100 feet; motor, 60 H.P.; speed of tongs, 200 feet per minute.

The Waterbury Farrel Foundry and Machine Company

Waterbury, Connecticut

OFFICES

CLEVELAND CHICAGO PHILADELPHIA

Boston, to American Bridge Co., Pittsburgh, Pa.

Shape Contracts Pending

2200 tons, Sheffield Farms building, Jamaica, Long Island, N. Y.; McClintic-Marshall Corp., Bethlehem, Pa., low.

2000 tons, addition to Archives building, Washington, McCloskey & Co., Philadelphia, low on general contract; approximately 500 tons of reinforcing bars also required.

2000 tons, public school No. 49, Brooklyn, N. Y.

1760 tons, six state highway bridges, Michigan.

1540 tons, seven schools, Philadelphia, bids opened last week; these projects follow: 575 tons, school at Twenty-second and Brown streets; 300 tons, J. B. Stetson Junior High School addition; 200 tons, school No. 48-E; 140 tons, school No. 47-A; 125 tons, school No. 2-B; 100 tons, school No. 40-L; 100 tons, school No. 22-F.

1400 tons, four state highway bridges, New Jersey.

1250 tons, including 700 tons, piling, armory, Schenectady, N. Y.; bids Dec. 27.

1150 tons, Bronx highway, New York; Bethlehem Co. Inc., Bethlehem, Pa., low.

1140 tons, state highway bridge, Windsor, N. Y.

1000 tons, state bridge, Guilford avenue, Baltimore, American Bridge Co., Pittsburgh, low.

1000 tons, Cermak road overhead crossing, Chicago; bids closed.

900 tons, Guilford avenue bridge, Baltimore; American Bridge Co., Pittsburgh, low on Dec. 10 bids.

850 tons, state highway bridge, Vandenberg county, Indiana.

830 tons, state highway bridge, Louisville, Ky.

780 tons, Madison Square postoffice, New York.

650 tons, high school, North Merrick, N. Y.

600 tons, five state bridges, Illinois; in addition to 600 tons reported last week.

510 tons, through plate girder bridge, Bradford and Lawrence townships, Clearfield county, Pennsylvania; B. B. Construction Co., Philipsburg, Pa., low on general contract at $244,880.69.

505 tons, water purification plant, Cincinnati; also 250 tons of pipe; bids in Dec. 13.

500 tons, armory, Rock Island, Ill.

500 tons, school buildings, Chattanooga, Tenn.

450 tons, bridge hand railing, Wheeler dam, Sheffield, Ala.

430 tons, high school, Ramsey, N. J.; National Iron Works, Jersey City, N. J., low.

410 tons, various schools, Pittsburgh.

400 tons, transportation and petroleum building, Dallas, Tex.

400 tons, school No. 16, Paterson, N. J.

400 tons, distillery building, Louisville, Ky., for J. E. Seagrams Sons.

350 tons, crossing elimination, Kenosha, Wis., Chicago & North Western railroad.

320 tons, shapes and machinery, also 30,000 square feet sheet piling, Spokane, control and power house; Puget Construction Co., Seattle, general contractor.

300 tons, bridge, Catskill, N. Y.

300 tons, state highway bridge, Canterbury, Conn.

265 tons, building, Krug Baking Co., Brooklyn, N. Y.

250 tons, Pan-American Union building, Washington.

210 tons, city incinerator plant garage, Cleveland; bids in.

210 tons, state highway bridge, Peru, Ind.

200 tons, state highway bridge, Petersburg, N. Dak.

200 tons, state highway bridge, Marquette, Mich.

130 tons, state bridge, Kittitas county, Washington; Henry Hagman, Cashmere, general contractor.

120 tons, Unity dam project, Oregon; J. A. Terteling & Sons, Boise, Idaho, general contractor.

113 tons, I-beam overpass bridge, Lawrence township, Tioga count, Pennsylvania, bids to state highway department, Harrisburg, Pa., Dec. 27; included 55 tons of plain steel bars.

108 tons, Sandusky county, Ohio, court house, Fremont, O.; bids in.

Unstated, 175 foot vertical lift span, Skagit county, Washington, bids at Mt. Vernon, Dec. 14.

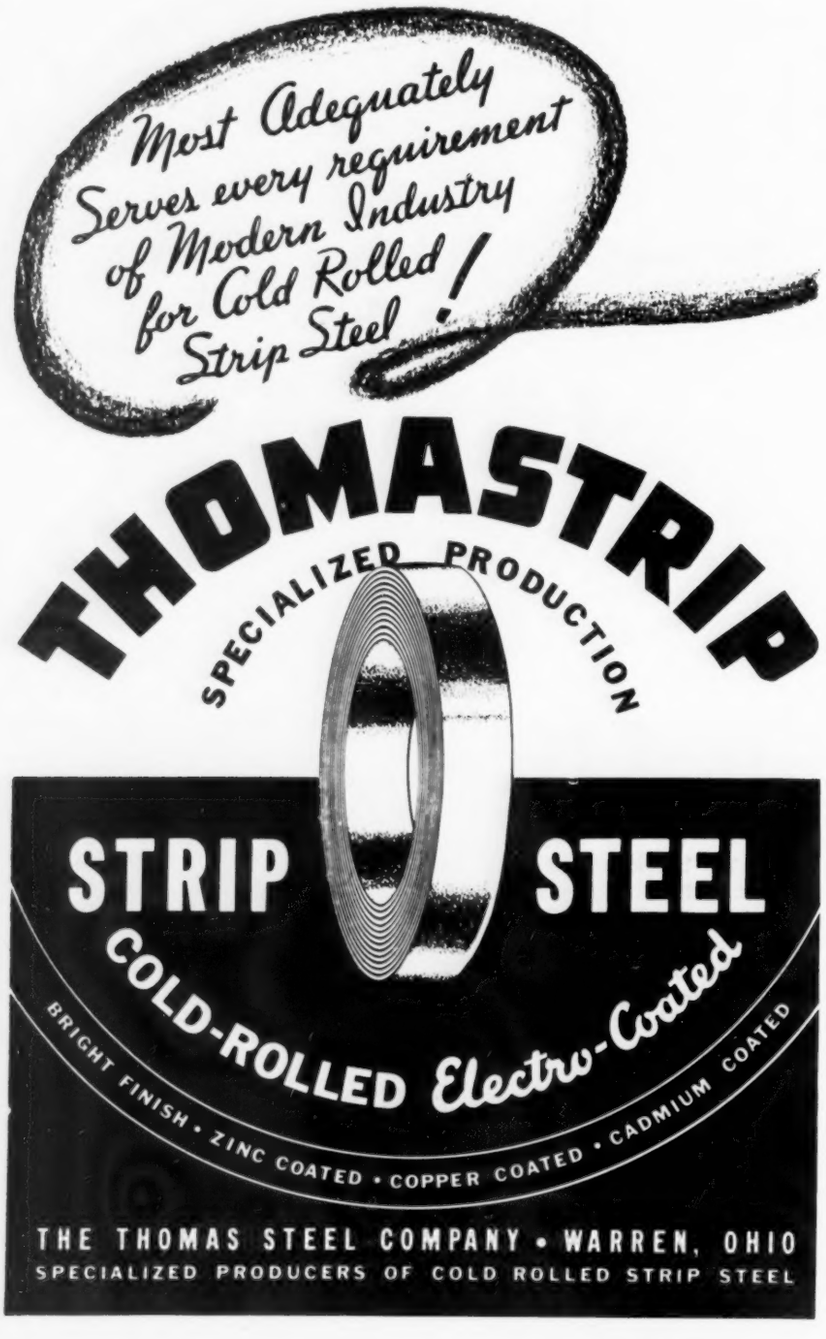
Unstated, state overcrossing, Jackson county, Oregon; Berke Bros., Portland, Oreg., general contractor.

Unstated tonnage, gymnasium Shelburne, Mass., Thomas J. Gass Co., Greeneville, Mass., low with bid of $42,403.

Unstated tonnage, school, Lansingburg, N. Y., Marinello & Stanco Inc., Albany, N. Y., low bidder.

Unstated, sanitorium, Paramus, N. J.; Breen Iron Works, Newark, N. J., low.

Unstated, rebuilding municipal docks, 23 to 24 streets, Hudson river, New York.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Reinforcing

Reinforcing Bar Prices, Page 61

New York—Reinforcing bar inquiries include several substantial tonnages. Bids will be opened Dec. 19 on 1400 tons for the New Jersey approaches to the midtown Hudson river tunnel, and the majority of bids will go in Dec. 16 on 2000 tons for New Jersey state highway work, for which approximately 1350 tons of shapes also will be required.

Pittsburgh — In the immediate Pittsburgh district the market is fairly steady at 1.85c, mill, for new billet bars, and 2.05c by distributors on carload lots. Bids will be readvertised in the near future on construction of new runways at the city-county airport, Pittsburgh. McCrady-Rodgers Co., Pittsburgh, was originally low at $55,511.

Chicago—Concrete bar awards are heavier, while pending work continues to accumulate. The latter largely is in the form of public works projects of which there is a large number. Bookings include 1000 tons for an Illinois state hospital, 650 tons for a medical and dental college building and 400 tons for state bridge work. For a state hospital at Dunning, Ill., about 400 tons remains to be placed.

Boston—Public work, particularly bridges, is accounting for the bulk of reinforcing bar activity here. Some moderate tonnages have been placed over the past week, with prospects of fair buying this week. Prices are fairly steady.

Philadelphia—The past week has been one of the most active, in number of projects figured, in the history of the local market. Practically all are government financed projects, and there are more than 80 schools. Private work is light, although featured by 400 tons for a plant addition for the Ludlow Mfg. Co., Edge Moor, Del. Prices continue unsettled.

Seattle—The market is active, and while few awards in excess of 100 tons were reported last week, heavy tonnages are pending and will be let during the month. Northwest Nut & Bolt Co., Seattle, has booked 1000 tons of rods and bolts for concrete forms at the Coulee, Wash., dam.

Concrete Awards Compared

	Tons
Week ended Dec. 14	3,265
Week ended Dec. 7	6,095
Week ended Nov. 30	2,985
This week, 1934	3,162
Weekly average, 1934	4,084
Weekly average, 1935	6,729
Weekly average, November	7,369
Total to date, 1934	212,213
Total to date, 1935	343,205

Reinforcing Steel Awards

1000 tons, rods and bolts for Coulee, Wash., dam concrete forms, to Northwest Nut & Bolt Co., Seattle.

1000 tons, state hospital, Manteno, Ill., to Inland Steel Co., Chicago.

650 tons, medical and dental college building, Chicago, for University of Illinois, to Inland Steel Co., Chicago.

400 tons, Illinois state highway bridge, to Calumet Steel Co., Chicago.

215 tons, sewage plant, New Brunswick, N. J., to Industrial Engineering Co., 50 Church street, New York.

Reinforcing Steel Pending

1000 tons, New Jersey state road work openings on Dec. 30, bids asked.

2500 tons, grade elimination in Jefferson county for Kentucky state highway department; also 700 tons piling and 760 tons structurals.

500 tons, Archives building addition, Washington, McCloskey & Co., Philadelphia, low on general contract; approximately 2000 tons of shapes also required.

400 tons, plant addition, Ludlow Mfg. Co., Edge Moor, Del., bids opened;

•

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will also require 1000 tons of shapes.

337 tons (also 78 tons metal work) Arrowroot dam project, near Boise, Idaho; bids to Bureau of Reclamation, Boise, Dec. 21.

246 tons, Unity dam, Burnt river, Oreg.; J. A. Terteling & Sons, Boise, Idaho, low.

230 tons, flood wall, Allentown, Pa., bids opened; will also require 185 tons of steel piling.

225 tons, 242 foot bridge for Tacoma, Wash.; MacRae Bros., Seattle, general contractor.

117 tons, also 57 tons bolts and miscellaneous, city bridge, Port Angeles, Wash.; Angeles Gravel & Supply Co., general contractor.

109 tons, including 33 tons shapes, state bridge Pierce county, Washington; bids at Olympia, Wash., Dec. 20.

103 tons, through plate girder bridge, Bradford and Lawrence townships, Clearfield county, Pennsylvania; B. B. Construction Co., Philipsburg, Pa., low on general contract at $244,880.69.

100 tons, state bridge, Kootenai and Bannock counties, Idaho; bids at Boise, Idaho, Dec. 10.

Unstated, Roza irrigation project, Yakima county, Washington; Morrison-Knudsen Co., Boise, Idaho, low at $1,001,567.

Unstated tonnage, Pennsylvania state road work, bids Dec. 27; this is in addition to road work on which bids will be opened Dec. 20, and to that on which bids were opened Dec. 13.

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COAL

Pickands, Mather & Co.

Cleveland - Chicago - Detroit - Erie - Toledo
Minneapolis - Duluth

Pig Iron

Pig Iron Prices, Page 62

Pittsburgh—As expected, no tests of the advanced prices has as yet developed, as virtually every consumer has covered at the former prices. The rising scrap market is diverting the attention of some melters toward possible heavier percentage of pig iron in their melt. The Brackenridge, Pa., consumer continues to receive sizable lots of iron by water from downriver producers.

Cleveland — Shipments for December are approximately 75 per cent larger than November, as melters specify fully on contracts placed before the $1 a ton advance. Contracting for first quarter is a little more active, and one merchant lake interest here booked 20,000 tons in the past ten days for that delivery, in lots up to 2000 tons. D stack of the American Steel & Wire Co.'s former Cleveland works is being reconditioned for production about Jan. 1, for merchant iron sales here. B stack may be put in operation later. These will be operated by the Carnegie-Illinois Steel Corp. A and C stacks were dismantled last summer.

Chicago—Consumption continues at a higher rate than was anticipated 30 to 60 days ago, and as a result less iron will be on hand for first quarter requirements than was expected. Shipments reflect this speculative purchasing, being around 35 per cent heavier than a month ago. Moderate tonnages are being booked for first quarter shipments at $19.50, furnace, for No. 2 foundry and malleable.

Boston—While some new tonnage is being placed, the bulk of current activity is confined to shipments against orders placed prior to the advance Nov. 1. As many consumers anticipated a good portion of their first quarter requirements in contracting at the old prices, a substantial tonnage will be carried over.

New York—Shipments are holding up well, although there are increasing indications that some consumers will not be able to take all they contracted for prior to the price advance by the end of this month. Some tonnage at the new levels continues to be placed, indicating that these consumers at least estimated short of their requirements in contracting at the old levels.

Philadelphia—As the year-end approaches it appears probable that a number of consumers will not be in position to specify fully against contracts placed prior to the price advance Nov. 1. What policy sellers will pursue in handling these con-

tracts, remains a question. Shipments are expected to be heavy, in all probability exceeding November.

Buffalo—Pig iron is being delivered on schedule by local furnaces and all consumers are taking their full purchases made earlier in the quarter.

Cincinnati — Shipments continue close to previously established levels. Spot buying and contracting for first quarter lags, hence there is absence of tests for new prices.

St. Louis—Shipments of tonnages contracted for prior to the latest advance continue in large volume, figures obtainable so far indicating a measurable gain over November. New buying is confined to small lots for prompt shipment. Owing to the higher price announced for after Jan. 1, melters are using pressure to get in all contract tonnages, despite the approach of the inventory period.

Birmingham, Ala. — Shipments continue active, to clear books of last quarter business. Contracting for first quarter has started, and indications point to additional blast furnaces being blown in. Eleven furnaces now producing iron will bring total output nearly 100,000 tons above 1934's figure.

Seattle—The market is firm, and no announcement of a price change for the first quarter has been made. Demand is somewhat improved, but pig iron is feeling the keener competition of scrap, steel plants having more work than cast iron foundries.

Toronto, Ont.—New business continues to hold steady, and is having a stimulating effect on sales. Demand is estimated at around 1000 tons per week, and orders are running close to this level. The daily melt is holding around 50 per cent. Prices are firm.

Scrap

Scrap Prices, Page 63

Pittsburgh—A Pittsburgh district independent mill in its anxiety to balance its existing stocks of light scrap caused a 50-cent per ton advance in heavy melting steel last week by its energetic buying. This mill paid $14.50 for tonnages and caused the entire market to advance because available supplies in several round tonnage lots were drawn to this consuming point. The result has been that brokers here with short orders at other consuming points have been forced to advance their buying prices to $14 for heavy melting steel. The ability last week of Pennsylvania railroad to dispose of some 47,000 tons of scrap further proved the present scrap market's ability to absorb heavy tonnages. Most of the items on this list confirm present quotations, although the heavy melting steel was sold at a wide range of $14.25 to $15.

Cleveland — Scarcity of heavy melting steel is causing dealers and brokers to pause in selling. The recent small railroad offerings were snapped up quickly at current prices.

Chicago — Expected buying of heavy melting steel by mills has failed to develop and the scrap market remains at previous prices. While shipments against contracts are fairly steady, these are being reduced. Prices are steady.

Boston—Dealers' buying prices have been advanced on skeleton scrap from a spread of $4.75 to $5 to a range of $6.25 to 6.50, and on stove plate from $4.25 to $4.75 to a spread of $4.75 to $5. All other grades are unchanged, with the export market still exerting a strong influence.

New York—Prices of steel and iron scrap are steady for all grades, with trading in moderate volume.

Philadelphia — While principal grades of steel scrap appear easier,

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prices are unchanged and in several other grades advances are noted. The easier tendency in steel is attributed in part to the fact that the Claymont, Del., consumer is out of the market and that the leading Coatesville, Pa., consumer, which this month obtained the 3500 tons of new compressed bundles from the Edward G. Budd Mfg. Co., Philadelphia, has suspended shipments on No. 1 steel and has curtailed considerably shipments on No. 2 steel.

Buffalo—Dealers are determined to lift scrap prices to points they consider reasonable and are ignoring tentative bids for heavy melting steel for first quarter delivery. Mills are well stocked as a result of water shipments last month and are declining to raise their bids.

Detroit — Advances of 25 cents per ton have been made in No. 1 and No. 2 steel, compressed sheet scrap, loose clippings, turnings and new No. 1 busheling. These increases reflect outside demand and local consumers have not revised buying prices upward as yet.

Cincinnati—Dealers in iron and steel scrap continue bullish although anticipating no tonnage contracting until after Jan. 1. Meanwhile, miscellaneous shipments have been made to nearby districts. No. 1 heavy melting steel is scarce.

St. Louis—Movement of iron and steel scrap on contracts is reported in substantial volume, but buying is at a minimum. Recent sales have been confined mainly to small quantities of special grades.

Birmingham, Ala.—While a little better movement of scrap iron and steel is noted, dealers say the market is not as steady as in pig iron. Quotations are practically unchanged.

Seattle—The market softened this week in the absence of Japanese inquiry, although local mills continue to buy. Prices dropped 50 to 75 cents, No. 1 heavy melting steel now being quoted at $10 and for rails $11 is offered. Supplies at tidewater are not heavy but ample for present demands. Reports from Japan indicate new orders will not be placed before February, due to overstocks.

Toronto, Ont.—Trading in iron and steel scrap in the Toronto and Montreal district continues steady with improvement reported for some grades. Shipments of heavy melting steel to the Toronto, Hamilton and Montreal mills are holding, with the Steel Co. of Canada taking deliveries on contracts.

Behind the Scenes with STEEL

Lamb

A WOMAN in northern Ohio has been a regular subscriber to STEEL for a number of years. When we asked her what her interests in the magazine were she told us: "My interest in reading STEEL is for the purpose of keeping informed in the industry, so as to

enable me in playing steel stocks on the market."

"But," she adds, "I am getting a great deal more than that out of it lately—in the Windows of Washington and Editorials. I find they are excellent in keeping up in the events of the times. I enjoy them."

Lady, take the advice of Roger W. Shrdlu; when you are playing those "steel stocks on the market" you are playing with fire.

• • •

Opinion

BURT PEARSON, manager and editor of the *Virginia Daily Enterprise*, at Virginia, Minn., is an enthusiastic reader of STEEL. He says: "I find your publication interesting and authoritative." Thereby echoing the sentiments of thousands of others, if we may be pardoned the interjection.

• • •

Goodwill

HOMESTEAD VALVE MFG. CO. at Coraopolis, Pa., presents to all plant visitors, salesmen, etc., a mimeographed blank which starts out by saying:

We welcome you to our plant and appreciate your visiting us. It is our aim to have you feel that you are a welcomed guest and toward that end various magazines (among them STEEL) *are laid out for your use, also cigarettes. But most of all we want to meet you quickly and transact the business for which you came, with the utmost dispatch and goodwill. After all, we too employ salesmen and field men and, therefore, know that your time costs money.*

There's gesture which we'll bet produces more goodwill than a thousand sweetly-smiling telephone girls inquiring: "Good morning, sir; who is it you wish to see, please?"

• • •

Nonchalant

THEY tell the story of the farmer who was demonstrating one of his horses to a prospective customer. After hearing of the steed's many sterling qualities the customer interrupted to inquire whether the nag could run.

Without saying a word the farmer picked up a fencepost and brought it smartly across the beast's rear quarters. In a flash the horse leaped across the field with all the speed of an Equipoise, but at the far side ran headlong into a stout oak tree and collapsed.

"What's the matter," said the startled customer, "is he blind?"

"Naw," replied the farmer, "he just don't give a damn."

• • •

No. 2 Man

ON A LENGTHY list of magazines requisitioned by the Naval Aircraft Factory at Philadelphia, STEEL *was No. 2, the first being a government-printed publication. This information is relayed to us by our circulation manager who is quick to seize any opportunity for a plug. We've done our bit.*

• • •

Score

DESPITE the fact that football uniforms are being put away in mothballs, and most gridirons are now skating rinks, we forward a bit of sprightly pigskin repartee glimpsed in the pages of the *Pittsburgh Bulletin-Index*.

It seems that a newspaper sports desk telephone rang loudly one Saturday afternoon and an editor answered to be greeted vociferously by a slightly alcoholized radio halfback.

"Do you know what the score is?" inquired the voice.

"No, I don't know the score," replied the editor, "what do you make it?"

"Seagrams 83—Vat 69," came back the voice.

—SHRDLU

Warehouse

Warehouse Prices, Page 64

Pittsburgh—Jobbers will advance the price of cold-drawn bars 15 cents per 100 pounds, or $3 per ton, effective Jan. 1, in conformity with increase by mills.

Chicago—While sales are declining, the decrease is considerably less than that ordinarily experienced in December. Jobbers plan to advance prices of cold-finished bars $3 a ton Jan. 1.

New York—Demand is lighter, reflecting seasonal influences. Prices are unchanged.

Philadelphia—Seasonal influences are depressing demand. Most resellers now look for little increase until after Jan. 1. Revision in cold-finished bars to conform with mill changes scheduled for Jan. 1, is likely to be announced some time before Jan. 1.

Detroit—Jobbers are preparing to announce an increase in the base price of cold-finished steel for effect about Jan. 1. This will probably be 15 cents per 100 pounds, identical with the mill advance of $2 per ton. Steel requirements of many miscellaneous industries are picking up the

slack since automotive plant rehabilitation and tool and die changes for 1936 have now been completed.

Cincinnati — Demand remains broad with building materials, especially for governmental projects, moderately active.

St. Louis—Early December sales by warehouses are making an exceptionally good showing. Current orders are small, but represent a satisfactory aggregate. Reaffirmation of mill prices through the first quarter have had little effect on business.

Iron Ore

Iron Ore Prices, Page 63

Cleveland — Stocks of Lake Superior iron ore on Lake Erie docks Dec. 1, amounting to 5,313,265 tons, were practically unchanged from the tonnage a year ago. The Lake Superior Iron Ore association reports receipts at the ports and, shipments therefrom for the season to Dec. 1, and dock balances as follows:

	Receipts	Shipments	Dock bal. Dec. 1, '35
Buffalo	2,127,912	4,013	3,184
Erie	1,035,642	1,068,342	71,749
Conneaut	3,437,860	3,346,892	1,800,815
Ashtabula	2,936,836	2,382,029	1,845,975
Fairport	772,260	778,813	387,085
Cleveland	5,447,483	4,023,350	755,947
Lorain	2,097,114	1,097,679*	12,527
Huron	748,178	659,109	408,840
Toledo	1,286,519	652,220	27,143
Total	19,889,804	14,012,447	5,313,265
Comparative One year ago	15,572,523	11,098,768	5,248,555

Receipts for the season at other ports:

	Tons
Detroit	1,154,208
Indiana Harbor	1,500,202
Gary	1,885,632
South Chicago	3,030,884
Sault Ste. Marie, Ont.	224,455
Hamilton, Ont.	358,674
Total	8,154,055
Comparative One Year ago	6,447,084
Total receipts lower lake ports	28,043,859

Ferroalloys

Ferroalloy Prices, Page 62

New York — With a reduction of $10 a ton effective Jan. 1, ferromanganese specifications over the remainder of this month are expected to be exceedingly light. The new price will be $75, f.o.b., port, and is based on an ore analysis of 50 per cent manganese, the present rate of duty of $5.60 per ton of ore, equivalent to $11.20 per gross ton of ferromanganese allowed. Any future change in manganese ore duty will be for the buyers' account. The reduction comes as a result of the operation Jan. 1 of the Canadian and Brazilian treaties, the latter affecting manganese ore.

Also effective Jan. 1 will be a reduction of $5 in silicomanganese, to a price of $85 a gross ton, carload contracts, 2½ per cent carbon, and a reduction of ¼-cent in manganese briquets. The later reduction will bring the spot carload price to 5 cents and the contract carload price to 4¾ cents.

Effective at once is a reduction in low carbon ferromanganese. This material with a maximum of 0.10 carbon will be 19 cents, per pound contained manganese, down 2 cents; 0.15 carbon, 18 cents; 0.30 carbon, 17 cents; and 0.50 carbon, 16 cents. The reduction in the latter three grades is 1 cent.

No other changes in ferroalloys are noted, with domestic spiegeleisen sellers opening their books for next quarter at the unchanged prices of $26, Palmerton, Pa., for 19 to 21 per cent material in lots up to 50 tons, and $26 on lots of 50 tons and over.

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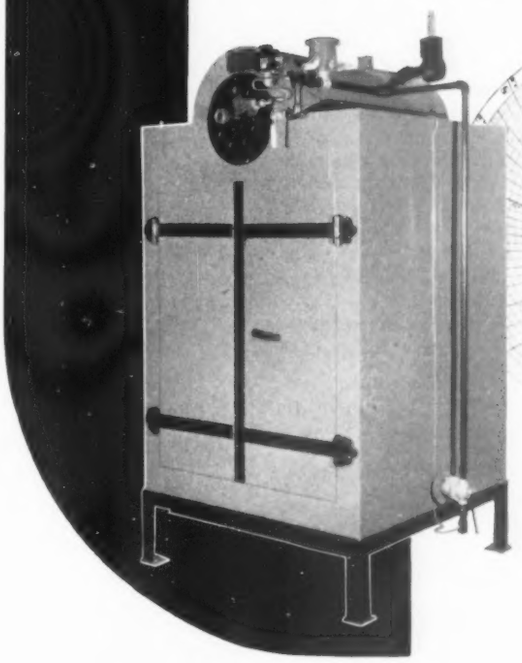

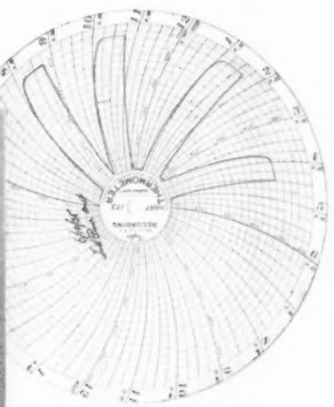

Heating time and precise temperature control are shown in the above chart. As little as ten minutes is required to heat the charge. Temperature uniformity can be held within 1 degree F. variation.

Steel in Europe

Foreign Steel Prices, Page 64

London—(*By Radio*)—Production of steel ingots and castings made a slight dip, from 907,300 tons in October to 903,300 tons in November. However, the shorter month brought the average daily rate for November to 34,742 tons, compared with a daily average of 33,603 tons for October. Pig iron production for November dropped to 525,100 tons from 544,300 tons in October. The daily rate for the two months varied little, 17,558 tons for October and 17,503 tons for November; 102 blast furnace stacks were active at the end of November, 99 at the end of October.

Buying of pig iron is quieter, with some Middlesbrough producers holding contracts to September, 1936. Two additional blast furnaces are being prepared for relighting. Steelmakers are actively occupied and semifinished demand absorbs all home production and steel imported under the Continental quota. Sheet mills are busy. Exports of galvanized sheets are dull but tin plate exports are fair.

The Continent reports export demand is somewhat quieter, with South America, China, Japan, India, and Russia taking most tonnage.

Semifinished

Semifinished Prices, Page 61

Producers are holding to their $2 a ton increase in rerolling billets, sheet bars, slabs, blooms, wire rods, and skelp for first quarter. The market is not settled, however, as many nonintegrated mills have not laid in stocks, and say they will not pay the increase. Semifinished steel sellers probably will have to permit shipments at the old price through January, on orders received up until Dec. 31 and their determination to enforce the $2 a ton increase apparently will not take full effect until some time about the middle of February.

Tin Plate

Tin Plate Prices, Page 60

Pittsburgh — Heavy demand for general-line cans continues to sustain canmakers' specifications for tin plate. Even though the season for packers' cans is over and tin plate producers are carrying in stock several million base boxes for these ultimate uses, the current heavy demand for beer cans, oil cans, and other general-line cans is a benefit to the market. Consequently, producers are able to engage operations at an advanced rate of 80 per cent, a gain of 5 points over a week ago. The price is unchanged at $5.25 per base box, Pittsburgh.

New York—The National Can Co., an affiliate of the McKeesport Tin Plate Co., McKeesport, Pa., has signed a contract with the King's Brewery Inc., Brooklyn, N. Y., to supply its tin beer can requirements for 10 years.

Metallurgical Coke

Coke Prices, Page 61

Metallurgical beehive coke prices have weakened recently and reductions of 25 cents a ton are now being quoted by leading sellers, placing standard furnace coke at $3.50, minimum, f.o.b., Connellsville, Pa., ovens, and standard foundry coke at a minimum of $4, also a reduction of 25 cents. The premium grade is steady and unchanged at $5.50 to $6. Demand has lightened considerably.

Demand at Cincinnati for by-product coke is heavy, with prices unchanged. Producers at Birmingham, Ala., are increasing output to rebuild stocks. Price has been advanced 50 cents to $6.50. In the Seattle area melters dependent on coke from Great Britain find prices advanced $1 per ton to $13.50, delivered.

Nonferrous Metals

Nonferrous Metal Prices, Page 62

New York—Collapse of the world silver market last week unsettled nonferrous metal market sentiment but copper, lead and zinc prices held firm on the basis of statistical strength. Tin continued to decline.

Copper — Sentiment improved Thursday on the favorable November statistics which showed a cut of 20,300 tons in total world industrial and non-industrial stocks. Sales were lighter last week than for the previous 7-day period but all producers again quoted electrolytic 9.25c, Connecticut.

Lead—Sales held up to fair tonnages and prices were unchanged on the basis of 4.35c, East St. Louis, and 4.50c, New York. St. Joseph lead again obtained $1 per ton premium on the latter market. Some observers expect a price advance within the near future.

Antimony — Prices continued to decline with Chinese spot closing 14.50c to 14.75c, duty paid New

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York, and American spot at 13.87½c. Demand continued light.

Zinc — New demand was light but the market displayed firmness despite recessions in London due to the silver situation. Supplies available from sellers at current levels are believed limited in all quarters. Prime western zinc was quoted unchanged at 4.85c, East St. Louis.

Tin—Prices broke through the 50-cent level. Easiness in the domestic Straits market reflected weakness abroad resulting from the silver decline and from the recent increase in first quarter export quotas by the International Tin committee. Buying was dull.

Activities of Steel Users and Makers

(*Concluded from Page 22*)

vision, which includes hot-rolled and cold-finished alloys, copper and brass, tool steels, stainless steels, etc., of which John S. Ewing, assistant general manager of sales, is in charge, and a hot-rolled division, covering all hot-rolled products, of which Earl E. Bates, assistant general manager of sales, will be in charge.

♦ ♦ ♦

Toledo Steel Products Co., Toledo, O., has added Tryon shackles, silent U shackles, Harris shackle bushings and tie rod ends to its line, according to an announcement by Joe E. Adams, sales manager of the company.

♦ ♦ ♦

United Engineering & Foundry Co., Pittsburgh, has been refunded $1154.26 as excess freight payments from the Erie and Pennsylvania railroads on recent direction of the public service commission, Harrisburg, Pa.

♦ ♦ ♦

Meriam Co., Cleveland, manufacturer of manometers and flowmeters for indicating pressure and flow of liquids, air, steam and gases, reports a substantial business gain in all three of its divisions over last year. The company's manufacturing space has been increased to eight times that of the original plant, and if business continues to increase at its present rate, a further addition will become necessary.

SUBSIDY GIVES GERMANS EDGE

Severe price competition from German manufacturers is handicapping American machinery exporters to Brazil. Because of the compensation mark agreement, German makers enjoy a price differential of at least 20 per cent. In addition, the German government grants a subsidy, making the German price advantage 50 per cent or more on many lines.

New Laboratory Is Bright, Colorful

(*Continued from Page 26*)

commercial and experimental smelters. Here also color samples for commercial color matching are studied and color laboratory development is carried on. Facilities are provided for filing physical and chemical tests of all raw materials.

This room has been designed to make the most of natural light. Porcelain enameled paneling in a peach color is carried to door height. The top of the walls and the ceiling are of masonite covered with aluminum leaf, which acts as a light reflector. Plum colored trim and stainless steel strips have been used to relieve the peach walls. The furniture and floor are pearl gray. Artificial lighting is indirect.

Another important department of the laboratory is the physical instrument room. The work done here requires the use of such instruments as the reflectometer, interferometer, and spectrophotometer in the study of enamel properties, and necessitates a darkened room. Walls are finished in burgundy red enamel panels which also have a gloss finish between the diamond pattern. Recesses which have been designed for shelves to carry equipment are in a deep blue porcelain enamel and ceiling, furniture and venetian blinds have been painted in the same color. A porcelain enamel trough in the ceiling carries a thin blue light, the only general illumination for the room.

Eye-appeal also was considered in the design of the shower and locker room. Extending around the room, as well as on the front of the toilet and shower stalls, is a porcelain enameled mural of marine design resembling an aquarium. Ceiling and upper walls are in black porcelain enamel with horizontal stainless steel strips. Lighting is indirect. Floor of the shower stall is a newly-developed, nonskid type of porcelain enamel.

The office of B. T. Sweely, director of research of the company, has been designed to eliminate all sharp

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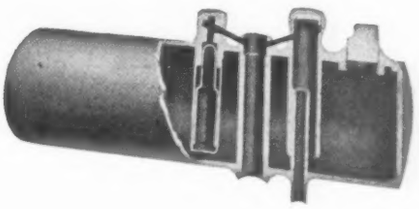

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angles. Demonstrating how to eliminate the possibility of dust collection, the room is rounded off into large radius corners, with curves all running in parallel planes. Walls are egg plant "velvet matt" porcelain enamel, and the ceiling is bright green with two bone white stripes. The floor is in egg plant linoleum, with a circular bone white stripe following the contour of the room. Furniture, of the modern type, is bone white, with the desk, table and filing cabinet tops in green porcelain enamel. All upholstering is green and white pigskin fabrikoid. A striking oil painting, indirectly-lighted, of a worker tapping a smelt of porcelain enamel frit is recessed in one of the walls.

Evolve Functional Design

Experiments have been conducted by Chicago Vitreous Enamel Product for several years in the search for a method of modern construction and functional design which will meet with the approval of architects and builders. General aims sought in this development work included: A type of construction that would make it possible to take out any unit of the building—that is any panel—without disturbing the surrounding panels, and with a reasonably simple and rapid operation; assurance that porcelain enamel surfaces would remain flat; a construction that would allow for expansion and contraction of the panels; elimination of any possible sweating on the back of the panel; insulation against heat, cold and sound.

These requirements, the company believes, have been met in the methods used in building the new laboratory. Fundamentally, this type of construction is simple. In addition to the panels and trim, it consists of only five elements:

1. General type of wall studding, either steel or wood, may be employed.

2. Furring strips are placed over studding and may be arranged for stainless steel strips to run horizontally, vertically or both.

3. A U-bar is used where there is a flange joint. Flange of the panel fits inside the U and is caulked with a plastic compound.

4. A T-bar is used where there is a panel strip, with the edge of the panels resting on the face of the T-bar and covered with a stainless steel covering strip, which is caulked underneath.

5. An angle bar is used for ceiling, coping or base. In this instance a special patented and prefabricated piece is used in which a stainless steel cover strip is fastened to the angle bar and filled with caulking. Panels then are slipped behind the folded edge of the strip and angle bar, and the spring tension of the stainless steel holds it in place.

Panels Are Insulated

In this type of construction the porcelain enameled panels are veneered to ¾-inch Celotex. This reduces the possibility of warpage, eliminates sweating and insulates the panels against heat, cold and sound. The panels fit into the framework of furring so that the metal section rests on wood and provides a weatherproof double framing. A U-shaped track containing a caulking compound is placed over the raw edges of the panels. This is screwed to the wall and seals the panel's edges but permits expansion and contraction. To improve the appearance, a snap-on cover strip of stainless steel is placed over the track, covering the screws. Flange joints are set into a key-shaped slot, then caulked with a special cement which remains plastic.

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IN BUSINESS

Equipment

Chicago—Seasonal influences are quieting some equipment markets, though activity remains relatively good. Additional inquiries, usually for single machine tools, are appearing from railroad shops. Heavier demand for repair parts reflects improved operations at car shops, but only small appropriations are available for new equipment. Business in small tools is steadier than usual for this period. Detroit continues the most active source of machine tool inquiries. Foundry equipment remains active both in orders and inquiries.

Pittsburgh—United Engineering & Foundry Co., here last week received a contract from Carnegie-Illinois Steel Corp., Pittsburgh, for the construction of the new 100-inch semi-continuous sheared plate rolling mill being installed at Homestead, Pa. The mill contract includes four 27-inch and 54-inch x 100-inch four-high continuous finishing stands with all connecting tables and gear drives, one 36-inch and 54-inch x 100-inch four-high reversing roughing stand with a vertical edging stand, one slab squeezer, one 42-inch and 52-inch x 120-inch four-high spreading stand, and one 36 x 100-inch two high non-reversing scale stand. Weirton Steel Co. has temporarily suspended operations at its Steubenville, O., works due to several changes in equipment, rehabilitation, etc., which are now being made.

Cleveland — Contract has been let by Empire Sheet & Tin Plate Co. at Mansfield, O., for installation of three-pot tinning equipment to be furnished by Wean Engineering Co., Warren, O. Estimated capacity is about 400,000 base boxes of tin plate yearly. Directors of Youngstown Sheet & Tube Co. have approved expenditure of $500,000 for repairing stack B of the company's Campbell blast furnace group. Equipment and plant of Standard Wire & Tube Co. at Mineral Ridge, O., in receivership for several years, were sold at auction recently, bringing only $18,645 from about 300 individual sales.

Construction and Enterprise

Michigan

DEARBORN, MICH.—Ford Motor Co. has plans under way for extensions and improvements in electrical division at power plant, including installation of additional equipment. Cost is reported in excess of $150,000. Giffels & Vallet Inc., Marquette building, Detroit, is consulting engineer.

DETROIT — Paul Sewell, 3300 Leslie road, architect, is taking new figures on an addition and alterations to the factory building of the Cogsdill Mfg. Co. here.

DETROIT—Announcement is made by John J. Corin, president of the Wayne Screw Products Co., of an addition to the plant. Expansion includes a 1-story building, 60 x 120 feet, and work is to start immediately with completion planned for January.

DETROIT—Plans are being prepared by Giffels & Vallet Inc., L. Rossetti, associated architects and engineers, for a die building at the Dix avenue plant of the Briggs Mfg. Co. The same architects also are taking figures on alterations and additions to plant No. 10 of the Murray Corp. of America, Detroit.

DETROIT—The following companies have filed papers of corporation: D. H. Baird Co., 9143 Central avenue, to manufacture industrial ovens; Underwood Scientific Instrument Corp., Benton harbor, to deal in electrical equipment; Dickinson-Stirling Co., 1311 Terminal avenue, to manufacture equipment; N. S. Black Co. Inc., 10959 Kercheval avenue, to manufacture portable hoisting machines.

KALAMAZOO, MICH.—Petition for dissolution of the Reed Foundry & Machine Co. was filed, recently, by a majority of the board of directors. The court appointed Ralph M. Fisher temporary receiver, and order was made directing all interested in the corporation to be in court Dec. 21, to show cause why a permanent receiver should not be appointed for liquidation of assets.

SAGINAW, MICH.—Saginaw Steering Gear plant of the General Motors Corp. is contemplating the arrangement of a suitable layout for the manufacture of many of the small parts going into the building of automobiles. Request has been made to the city council to close Clinton street, between Hamilton street and the river, to facilitate the building of additional floor space. A. W. Phelps is plant manager.

Ohio

BARBERTON, O.—Columbia Alkali Corp., a subsidiary of the Pittsburgh Plate Glass Co., Grant building, Pittsburgh, is planning the installation of electric power equipment in new plant addition, to be used for the production of chlorine, a new output for the company. Cost is estimated at over $1,000,000.

CINCINNATI — Queen City Steel Treating Co. is planning a new and larger plant for hardening, tempering, and other processes in treating machine parts. E. P. Stenger is president.

CINCINNATI — Red Top Brewing Co., 1747 Central avenue, is planning a new steam power house for service at the plant. Installation will include two boiler units with accessories, stokers, and other equipment. Bids are scheduled to be asked soon. Carl J. Kiefer, Schmidt building, is consulting engineer.

CINCINNATI — Queen City Steel Treating Co. will undergo a three-fold expansion program in the construction of a modern plant at Spring Grove avenue, Hopple and Meeker streets, in the Camp Washington industrial district. Plans call for a 2-story office and 1-story foundry. E. P. Stenger is president.

HILLSBORO, O.—Caldwell Mfg. Co., W. F. Caldwell president, is contemplating plans for entering the automobile tourists trailer industry in the near future. Two trailers are now under construction at the plant on West South street, as an experiment. If their completion is satisfactory, an addition will be made to the building in order that an assembly track may be housed. Joints of trailers are reinforced with steel angles.

MARION, O.—The Baker Wood Preserving Co., of Washington Court House, O., will move its plant here, according to W. D. Brown, secretary of the Marion chamber of commerce.

Indiana

HARTFORD CITY, IND.—Severe damage was done in an explosion of the paint drying furnace of the Overhead Door Corp. in this city, recently. Considerable damage was also done to the building in which the furnace was located.

INDIANAPOLIS—Lake County Sheet Metal & Roofing Inc. has been incorporated to manufacture sheet metal and roofing materials, 3549 Connecticut street, Gary, Ind., by Richard S. Melvin, 632 Broadway, Gary, resident agent, Tom Novotny, and J. Coleman Melvin.

MADISON, IND. — Earl Lupton has opened a machine shop in the Risk & Son garage building, corner of Third and Jefferson streets here.

New York

ALBANY, N. Y.—A list of 12 possible locations in this city for the $5,000,000 Osuch Mfg. Co. plant was forwarded to the Detroit concern today by Mayor Thacher.

BATAVIA, N. Y.—City, city hall, is planning a municipal airport, hangar, lighting equipment, etc., on State street. Cost is $75,000 or more.

BREWSTER, N. Y.—New York State Electric & Gas Corp., Albany, N. Y., sustained a fire loss recently at equipment storage and distributing plant here, totaling close to $125,000, and plans to replace structure.

BUFFALO—Virginia Delaware Corp., 455 Delaware avenue, is planning on the installation of several 500-gallon steel tanks, electric pumps, etc., with cost to exceed $1000.

NEW YORK—Hudson Lighting Fixtures Inc. has been incorporated to deal in machinery, tools, household supplies, and every other device for lighting or heating by electricity. Papers were filed by Martin J. Desmoni, 1501 Broadway.

SYRACUSE, N. Y.—Wheler Crate & Blower Co. Inc. has been incorporated to deal in crates and furnaces by A. Gordon Wheler, 1120 Euclid avenue; Lee Carroll, 118 Euclid avenue; and Henry Unkauf, 203 Helen street. Papers were filed by Lee Carroll, Onondaga county savings bank building.

SYRACUSE, N. Y. — Continental Can Co. Inc. is considering plans for enlarging its plant here. It is planned to increase space for both can-making and can-closing machinery. O. C.

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Huffman is president of the company, the main office being at 100 East Forty-second street, New York.

Pennsylvania

MEADVILLE, PA.—Public auction on the land, machinery, and supplies of the William Page Boiler Co. will be held Dec. 18, under the management of Industrial Plants Corp., New York.

PHILADELPHIA—Frankford arsenal asks bids Dec. 17 for a portable crane.

PHILADELPHIA—Frankford arsenal asks bids Dec. 18 for bar steel.

PITTSBURGH—Penn Oil Co. plant, South Thirty-second and Carson streets, was damaged by fire Dec. 4.

POINT MARION, PA.—Jones & Laughlin Steel Corp., Pittsburgh, is rushing preparations for the reopening of its Bobtown mine. Improvements incidental to the reopening of the operation are being rushed. It is expected that work will be resumed not later than January.

READING, PA.—Berrylium Products Corp., E. C. Childs executive, has moved into the plant formerly occupied by the Temple Malleable Iron & Steel Co., having been previously located in Marysville, Mich. It is estimated the plant will again go into production about Feb. 1, 1936, and construction changes are already under way, with machinery being installed.

TITUSVILLE, PA.—Cyclops Steel Co. plans the installation of electric power equipment in new addition to tool steel works. The former factory of Romeson Mfg. Co., on adjoining site and idle for a number of years, has been purchased and will be remodeled and equipped for expansion, at a cost of about $75,000. C. T. Evans is president.

Illinois

CHICAGO — Sherwin-Williams Co., paint and varnish manufacturer, Cleveland, plans an addition to its plant at 115th street and Cottage Grove avenue, to cost $750,000 to $1,000,000. Expenditures cover new buildings and equipment.

JOLIET, ILL. — Construction of two new rod mills is to begin in sixty days, according to announcement by officials of the American Steel & Wire Co. The mills will have a combined yearly capacity of 220,000 gross tons and will cost approximately $3,000,000.

NORTH CHICAGO, ILL. — Fansteel Metallurgical Corp. has marketed common stock at $200,000, proceeds of which are to be used for working capital and to finance some expansion. The company manufactures tabtalum and tantulum carbide products.

Connecticut

NORWICH, CONN. — Monarch Iron & Metal Co. Inc. has been incorporated by Irving Klein, Joseph J. Traub, and Hart A. Latshaw.

Maine

PORTLAND, ME.—City manager, 389 Congress street, has plans maturing for new steam power house, coal pocket with distributing system, and mechanical laundry at city hospital. Cost is to be about $90,000 with equipment. E. R. & E. S. Higgins, Congress street, are architects.

Alabama

BIRMINGHAM, ALA.—W. W. Smith & Co., First avenue, wants 1500 feet of cast iron pipe, 100-pound pressure, 8-inch universal joint. Will consider 85-pound pressure.

BIRMINGHAM, ALA. — Contracts valued at more than $2,000,000 have been let on the first work of building a canal across Florida. The work of WPA airport improvement in Alabama is estimated at $2,000,000 by government agencies and work must be started within the next few weeks. Bids have been opened at offices of United States engineers in Mobile, Ala., for construction and installation of crest gates at dam No. 17 on the Black Warrior river. Approximately 1400 tons of steel will be used in this work.

MONTGOMERY, ALA. — Montgomery City Lines Inc., A. A. Chow manager, proposes to establish a terminal for bus line recently granted a franchise. $125,000 will be invested in new buses, and 10 main motor bus routes will be operated.

Maryland

BELCAMP, MD. — T. and A. Bata of Zlin, Czechoslovakia, manufacturer of shoes, has purchased a 1400-acre tract here, and will build an ultra-modern factory employing about 5000 men and women.

BALTIMORE—Fred Gilman will erect a service station, including six 1000-gallon tanks and six pumps, 164-170 South Calverton road.

Georgia

AMERICUS, GA.—Mayor and city council, James A. Fort mayor, are interested in securing canning plant for the town. Also interested in obtaining a branch packing plant of one of the large packers.

ATLANTA, GA.—Georgia Sprinkler Co. wants power threading machine with individual motor drive, threading ¼-inch to 2-inch.

ATLANTA, GA. — Star Provision Co., 600 Marietta street, northwest, will erect a packing plant on Howell Mill road and Fourteenth street, northwest, including in its construction steel sash and miscellaneous iron and steel. Peter Henschien, 59 East Van Buren street, Chicago, is architect.

CALHOUN, GA.—G. C. Bennett has opened a roofing company on Railroad street in the Auto Body shop where he will handle sheet metal work and stove pipes.

COLUMBUS, GA.—Pepsi-Cola Co. will establish a bottling plant at Front avenue and Dillingham street, in a building purchased by Frank S. Etheridge, manager of the Columbus Beverage Co.

GAINESVILLE, GA.—City opens bids Dec. 11 for construction of filter plant, clear water well, pumps, elevated tank, and distribution system for waterworks. PWA appropriation of $110,000. Wiedemann & Singleton, 1404 Candler building, Atlanta, Ga., is engineer.

ATLANTA, GA. — Southern Iron & Equipment Co., Hempkill avenue and Southern railway, Box 2029, wants prices and data on 1200 feet of 4 or 6-inch used, bell joint cast iron pipe; maximum 12-inch capacity pipe threading machine; 1½ yard crawler type gasoline shovel; 20,000 tie plates for 56-60 pound rail.

PALMETTO, GA. — City, Dr. T. D. Bullard mayor, plans $50,000 waterworks improvements, including steel tank and tower. A PWA project, plans will be ready for distribution soon. J. B. McCrary Co., 22 Marietta street, Atlanta, Ga., is engineer.

Mississippi

FOXWORTH, MISS. — J. R. Holley Jr. is constructing a lumber manufacturing plant, with saw mill and drying sheds to be constructed. Lumber is to be purchased and made into finished products.

HATTIESBURG, MISS.—Hub City Ice Co. plans to establish a meat packing plant in the Hardy street

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building, near Tenth avenue. C. Z. Stevens Sr. is president.

BATESVILLE, MISS.—Swift & Co., Union stockyards, Chicago, is considering the establishment of a cheese plant.

JACKSON, MISS.—Attapulgas Clay Co., Attapulgas, Ga., is planning the establishment of a factory here for the processing of bentonite into filtering materials. Cost will be approximately $300,000.

PHILADELPHIA, MISS.—Mississippi Power Co., Gulfport, Miss., signed contract with citizens committee, chamber of commerce, and representatives of Massachusetts Knitting Mill, Boston, for establishment of a knitting mill. Construction of building wth 50,000 square feet of floor space will begin immediately, financial investment to be $800,000, including the installation of 80 complete hosiery units with accessories.

WEST POINT, MISS.—The plant of West Point Casket Co. was seriously damaged by fire recently.

Florida

JACKSONVILLE, FLA. — City commissioners have made application to PWA for loan and grant of $2,000,000 to extend power lines into rural sections of Duval county and several municipalities. Also erect additional high tension cable between Laura street power plant and McDuff avenue substation. A loan of $150,000 has been granted.

PANAMA CITY, FLA.—Pure Oil Co. has acquired land on Watson Bayou for the construction of ocean terminals to use as distributing point for inland and ocean going dispatch, with dock and storage facilities.

PENSACOLA, FLA.—City, George Roark manager, received approval for a $150,000 airport improvement which will be projected under PWA.

PENSACOLA, FLA.—Navy department, bureau of yards and docks, Washington, opens bids Dec. 28 for construction of hangars and quarters at naval air station; specifications 8082 and 8083.

North Carolina

ENKA, N. C.—American Enka Corp., A. J. L. Moritz vice president, 271 Church street, New York, plans expending $500,000 on normal replacements in 1936.

COLUMBIA, N. C. — Tyrrell Lumber Co. has been incorporated by Ben E. Martin of this city, and W. A. Williams of Asheville, N. C.

SHELBY, N. C. — City board of aldermen, Reeves Forney city clerk, passed ordinances authorizing issuance of bonds for various city improvements, including $7500 for installing meter boxes, $20,000 for waterworks extensions, $25,000 for sewer extensions, $25,000 for street improvements, and $15,000 for city hall alterations.

SPINDALE, N. C.—O. C. Smith has acquired several thousand acres of white oak timber lands near Chimney Rock, N. C., on Bald and Sugar Loaf mountains; will establish a barrel stave factory in East Spindale.

WILMINGTON, N. C.—Bureau of aeronautics, department of commerce, Washington, has approved $60,000 improvements to Bluethenthal field.

WINSTON-SALEM, N. C.—The Henry Miller Steel Co. has been incorporated to manufacture, buy, and sell all kinds of structural steel by Henry A. Miller, O. D. Bell, and H. Bryce Parker, all of Winston-Salem.

Louisiana

EUNICE, LA.—Continental Oil Co., Oklahoma City, Okla., has acquired 80 acres from Tepetate Oil Co., of this city, for construction of a cracking plant to be built immediately. Cost of project is approximately $100,000.

LAKE PROVIDENCE, LA.—Lake Providence Ice Co. has authorized plans for rebuilding its ice-manufacturing plant, recently damaged by fire. Loss includes two oil engine units, two ice-making machines, and auxiliary equipment, totaling close to $50,000.

Tennessee

CHATTANOOGA, TENN. — Contractors Machinery & Supply Co. has been incorporated by W. F. McWhorter and Burton Franklin, 704 James boulevard and Signal street.

CHATTANOOGA, TENN.—Building permit for the construction of the United States Pipe & Foundry Company's new plant, here, has been issued, calling for an expenditure of $200,000 for the erection of a new steel and brick building, and for repairs and additions to other buildings. The new plant will be located on West Twenty-sixth street, between Chestnut and River streets. Announcement of the enlargement program, which will represent a total expenditure of about $500,000, was made several months ago, and work of razing some of the old buildings is under way.

CHATTANOOGA, TENN.—Tennessee Electric Power Co. announces its 1936 budget, calling for $2,000,000 of construction of which about $600,000 will be expended in Chattanooga, $600,000 in Nashville, Tenn., and $800,000 throughout the remainder of the company's territory. Approximately $1,900,000 is intended for electrical divisions of the property and the remaining $100,000 for transportation, water departments, and miscellaneous construction; improvements are scheduled for several generating plants and the largest single item in the construction budget will cover poles, fixtures, customer's services, meters and transformers, incident to taking on new business. J. C. Guild Jr. is president.

MAYNARDVILLE, TENN. — Union county court granted franchise to Tennessee Valley Authority, Knoxville, Tenn., for extension of rural power lines throughout the county, and authorized County Judge S. S. Inklebarger to petition the authority to extend lines into the county.

MEMPHIS, TENN. — International Fabricated Products Inc. has been incorporated by C. W. Allen Sr., and W. C. Pope, Exchange building.

NASHVILLE, TENN.—E. K. Hardison Seed Co., 107-109 Broadway, is in need of cleaning machinery.

NASHVILLE, TENN.—R. M. Condra Co., 206 Hitchcock building, wants a small rock crusher and screens and a 2-hammer air compressor.

ONEIDA, TENN.—Buffalo Stove Co., has been incorporated by L. W. Clark and N. G. Sawyer.

South Carolina

COLUMBIA, S. C.—State Santee-Cooper authority, Burnet R. Maybank mayor of Columbia, chairman, has engaged Parsons, Klapp, Brinckerhoff &

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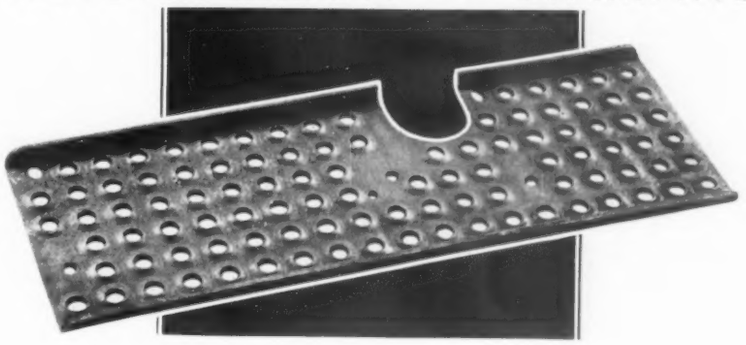

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Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

Douglas, 112 Maiden lane, New York, consulting engineers, to make surveys and plans for proposed hydroelectric power and navigation projects on Santee and Cooper rivers. Through federal aid, an initial appropriation of $500,000 has been secured. Two large hydroelectric generating stations are included in the project, with power lines to different points. The entire program is estimated to cost $37,500,000.

GREENVILLE, S. C. — G. D. Altman, 1209 Buncombe street, wants prices and data on brick (clay) manufacturing machinery.

West Virginia

WARWOOD, W. VA. — Wheeling Steel Corp. has received permission to construct an addition to its Ackermann Mfg. plant here at a cost of $8000.

WHEELING, W. VA. — The American Oil Co. was granted a $25,000 permit by Building Inspector W. J. Emmerth for the construction of a gasoline bulk plant on Vance avenue in North Warwood, W. Va.

Virginia

LURAY, VA. — Luray town council, L. M. Lawler and others, is considering proposals for construction of a municipal power plant. Manufacturers of steam and oil engines are invited, with manufacturers of electrical generating equipment, to submit proposals on project.

Missouri

ST. LOUIS — Transamerican Freight Lines Inc., J. M. Harty branch manager, 629 South Sixth street, is making $15,000 alterations to building at 2306 North Broadway for truck depot, including $7500 loading dock, 12,000-gallon capacity gas storage tank, office space, etc. Buildings contain 36,000 square feet of floor space in addition to 2500 square feet of loading yard. Premises will be occupied about Jan. 1.

ST. LOUIS — Cupples-Hesse Envelope Co., Eugene Harms president, 4173 North Kings highway, plans to expend $100,000 for new building and manufacture food cups. Structure will contain 50,000 square feet of floor space, and adjoin present plant. An expenditure of about $75,000 for new machinery and equipment is involved in the operations which will begin early in January.

Arkansas

BLYTHEVILLE, ARK. — Blytheville Canning Co. has acquired additional building for canning plant and will install additional machinery, doubling its capacty. George W. Greb is president.

Oklahoma

OKLAHOMA CITY, OKLA. — Midwest Materials Co. has been incorporated by J. F. Frazier, 1104 Northeast 15th street, and R. E. L. Finley, both of this city.

OKMULGEE, OKLA.—Okmulgee Machinery & Equipment Co. has been incorporated by J. D. Roberts and John K. Allen.

OKLAHOMA CITY OKLA.—City, Orval Mosier manager, has completed specifications for $140,000 improvements at south side sewage disposal plant and city filtration plant. Tom G. Banks is city water superintendent.

OKLAHOMA — The following cities have WPA allotment for airports: Altus, $45,000; Atoka, $40,000; Blackwell, $50,000; Chickasha, $40,000; Claremore, $25,000; Ardmore, $100,000; Duncan, $30,000; Enid, $70,000; Heavener, $40,000; Poteau, $60,000; Tulsa, $130,000; Woodward, $50,000; Lawton, $20,000; Mangum, $25,000; Muskogee, $100,000; Oklahoma City, $135,000; Ponca City, $100,000; Seminole, $60,000; Wewoka, $30,000; Shawnee, $100,000; Stillwater, $50,000.

Texas

BEAUMONT, TEX.—City commission approved federal application for airport improvement project to cost $60,000. The city is to provide $20,000.

BLUFFTON, TEX.—Lower Colorado river authority, Llano county, has work under way on proposed hydroelectric power project on Colorado river, where a site was recently secured from the Colorado River Co. including a partly completed dam. Financing necessary $20,000,000.

DALLAS, TEX. — International Beverages has been incorporated by C. H. Brown and M. Johnston.

DALLAS, TEX. — Texas Co., J. S. Leach manager, Houston, Tex., plans erecting a $75,000 exhibition building in connection with the Texas centennial celebration.

DALLAS, TEX. — Briggs-Weaver Machinery Co., 309 North Market street, is changing its present $100,000 of preferred stock to common stock, and is increasing common stock from $200,000 to $250,000.

HOUSTON, TEX.—Joseph Finger Inc., architects, have completed plans and are ready for bids for a new plant, 300 block Yale street, for Main Baking Co., 2203 North Main street. Cost is $45,000, and project includes warehouse and baking plant proper with steel windows.

PORT LAVACA, TEX.—City, F. M. Dudgeon mayor, forwarded plans to state PWA office, Ft. Worth, Tex., for construction of a power plant, including harbor improvements, etc.

SAN ANTONIO, TEX.—Construction at Duncan, Kelly, and Brooks fields is being executed by purchase and hire. Lieut. T. R. Hickey, office of the quartermaster. Appropriations cover following projects: Kelly field: $68,250 for gasoline and oil storage and distribution system; $52,400 for miniature range building; $170,000 for paved aprons; $180,000 for improvements to landing field and building area; $3000 for construction of machine gun butts. Brooks field: $15,000 for gasoline and oil storage and distribution system; $75,000 for paved aprons; $73,000 for improvements to landing field and building area. Duncan field: $17,250 for gasoline storage; $105,000 for paved aprons and runways.

SAN MARCOS, TEX.—Guadalupe-Blanco basin improvement association, H. C. Kyle secretary, is making plans for a flood control and power project including locations on Guadalupe, Blanco, and San Marcos rivers. Cost is $5,600,000. Directors of Guadalupe authority will be named, and application for federal loan and grant is now on file at national headquarters building, Washington.

Wisconsin

FOND DU LAC, WIS.—Equipment costing $140,000 will be purchased by Wisconsin Power & Light Co., Madison, Wis., for addition to water gas plant here. Building work is to begin about March 15. Fred W. Hainer, Madison, is chief engineer of gas division.

MILWAUKEE—Louis Allis Co., 427 East Stewart street, is building an addition, 40 x 75 feet, to its casting department.

MILWAUKEE—Paint shop of the International Harvester Co. here is being remodeled and enlarged by addition.

RACINE, WIS.—Iroquois Foundry

(*Please turn to Page* 86)

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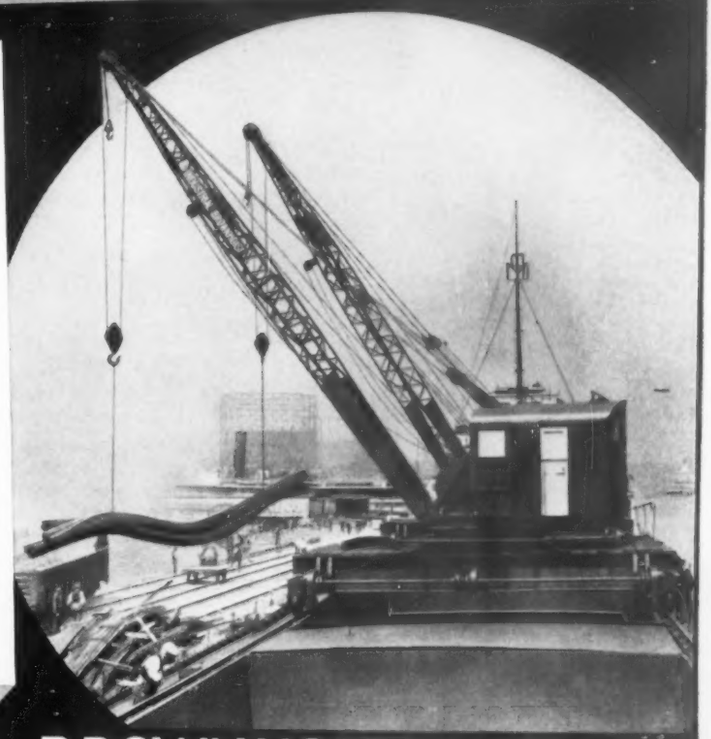

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(*Concluded from Page 84*)

Co. has purchased a new plant on 1600 Layard avenue. Formerly occupied by the Simplex Furnace Corp., the building is being equipped with the latest foundry equipment, and it is intended to branch into light gray iron production, ultimately to concentrate in it. General jobbing foundry work is being done by the concern now. Expansion plans call for completion of alterations and re-equipment in about 60 days. R. L. Neiss is president and August Vierthaler is vice president.

RIPON, WIS.—Oscar Zahn has sold his Sheet Metal Works, Belleville street, to L. Loehr and B. Voysey, both of Fond du Lac, Wis., who will continue to run the business as formerly, possibly adding new departments as required.

Minnesota

MINNEAPOLIS — Minneapolis Honeywell Regulator Co., 2727 Fourth avenue, south, manufacturer of heat regulators and other control instruments, is planning the installation of electric power equipment in new 6-story addition. Cost is estimated at $200,000 and E. J. Prondzinski, Pence building, is architect.

ROCHESTER, MINN. — Public utility board, city hall, A. J. Lentfer, secretary, is considering extensions and improvements in municipal electric power plant, including the installation of a new boiler unit and accessories, superheater, underfeed stoker, coal pulverizing equipment, draft fans and auxiliary equipment. An early call for bids is expected. Burlingame & Hitchcock, Sexton building, Minneapolis, is consulting engineer.

Iowa

OGDEN, IOWA—Common council is considering the construction of a municipal electric light and power plant, with electrical distribution system, at a cost of about $91,000. Financing will be negotiated through federal aid. J. M. Pilmer, 810 Prospect road, Des Moines, Iowa, is consulting engineer.

Pacific Coast

BAKERSFIELD, CALIF.—Plans are being prepared for a $100,000 hangar and shop building to be constructed at the county airport in this city. Charles H. Biggar is the architect. The structure will be of steel frame.

LOS ANGELES — Bids are being received by Paramount Productions for construction of an $80,000 storage building at 5451 Marathon street. The new unit is to be two stories in height and have ground dimensions of 100 x 415 feet.

LOS ANGELES — A building, at the northeast corner of Melrose avenue and Gower street, houses three new sound stages of the R-K-O Radio motion picture studio and is part of the $500,000 new construction program here. New construction programs launched, under way, or contemplated at various motion picture plants, in this region, total several million dollars.

LOS ANGELES—Important modernization and improvements of the Los Angeles plant of the Pacific Coast Steel Corp., subsidiary of the Bethlehem Steel Corp., are planned, according to Eugene G. Grace, president. The Pacific Coast plants make sheets, bars, nuts and lighter steel structural products.

LOS ANGELES—A new plant consisting of an office structure and a factory building is being built for the Lane-Wells Co. on Soto street and Slauson avenue here, on a 2½-acre site, for the manufacture of gun-perforators, oil well packers, and liner hangers. The plant will also house the Technicraft Engineering Corp., a subsidiary company devoted to research and development of engineering products. The completed plant will represent an investment of $50,000.

LOS ANGELES — Announcement of the location of a branch factory, in the city's central manufacturing district, of the Globe-Union Mfg. Co., maker of batteries, was made recently by C. O. Wanvig, president of the company. The company has obtained an option on approximately 50,000 square feet of ground on District boulevard, and a total investment of $100,000 is planned for the plant site and equipment. The building will be designed to adapt itself to expansion and manufacturing operations will begin Feb. 15, 1936.

LOS ANGELES — Glendale's new junior college, fronting on Verdugo road at La Canada boulevard in the Rossmoyne area, will represent an aggregate investment of between $850,000 and $1,000,000, when finished. George M. Lindsey is the architect for the entire project. Glendale voters several weeks ago approved a bond issue of $195,000 for the city's share of the initial construction work, and application has been made to PWA for a grant of $159,597. It is expected that the initial construction program will take nine months to complete.

REDWOOD CITY, CALIF.—City has ordered surveys made for improvement of harbor, including dredging, wharves, warehouse, etc. Cost is to exceed $25,000, and E. L. Dimmitt is city engineer. This development is independent of harbor plan originally contemplated by San Mateo Co., harbor district.

SAN FRANCISCO—Shipbuilding and steel fabricating plant of the Bethlehem Steel Corp. here is to be completely modernized soon, according to Eugene G. Grace, president. Between $1,500,000 and $2,000,000 will be spent, and the local plant will then be equipped to construct modern ships as well as repair them.

PORTLAND, OREG. — Portland Electric Power Co. plans a $50,000 expansion program in Washington county, involving construction of 47 miles of transmission line.

PORTLAND, OREG. — George Buckler Co. has the general contract for the reinforced concrete warehouse and refrigerator plant, costing $150,000, for the Union Pacific system, leased by the Pacific Fruit & Produce Co. The plant includes ten air-conditioned banana rooms.

BREMERTON, WASH. — Pacific Sheet Metal Works has been purchased by Lents Inc. L. Thieman, former owner, will remain as engineer.

OLYMPIA, WASH. — Bowen & Banker Inc. has been formed by Charles H. Bowen and associates, 717 Capital Way, to deal in machinery.

SEATTLE — City water department plans new buildings and garage and shop addition with improvements to cost $35,000.

SEATTLE — H. D. Fowler, superintendent of the city water department, proposes that the city undertake the production of all gate valves up to 16 inches, required by various municipal departments.

SEATTLE — Northern Smelting & Refining Co., 81 Marion street, has been incorporated by Van S. McKenny and associates.

SPOKANE — Armstrong Mines Inc., 501 Pailsen building, has been formed by G. C. Arnold and associates.

SEATTLE—Gold Mint Mining Co., 109 First avenue, has been incorporated by F. O. Burchardt and associates.

SEATTLE—Thomas R. Beeman, city engineer, is preparing plans for a proposed sewage disposal plant and system estimated to cost $500,000.

TACOMA, WASH. — Chamber of commerce is surveying in regard to a plan of financing construction of a $2,000,000 drydock plant. W. C. Nickum, Seattle marine merchant, has been engaged to prepare preliminary plans for a wooden structure.

TACOMA, WASH.—Spear & Jackson, 1414 Puget Sound building, has been incorporated to manufacture machinery and appliances.

Dominion of Canada

TORONTO, ONT. — International Nickel Co. of Canada Ltd. has announced organization of the Whitehead Metal Products Co. of Canada Ltd. and installation of equipment, for the manufacture of monel metal hot water tanks at the Port Colborne, Ont., plant.

MONTREAL, QUE.—Canadian Industries, Beaver Hall hill, is planning an addition to its plant, at a cost of $100,000. Maturity in the spring.

REGINA, SASK.—Plans are being made for improving municipal power plant including new turbine-generator unit and auxiliary equipment, high pressure boilers, pumps, and other equipment. Bids at an early date, with cost to exceed $500,000. E. W. Bull is chief engineer and superintendent.

Foreign

FRASER MILLS, B. C.—Canadian Western Lumber Co., located near New Westminster, B. C., is planning a $100,000 expansion program including the installaton of a veneer dryer, construction of a conveyor system to take refuse from shingle mill to company's main power plant, and addition of 450-horsepower boiler to increase power plant capacity.

LIVINGSTON, BRITISH SOUTH AFRICA — Municipality is making plans for a hydroelectric project at Victoria Falls, including transmission lines to the city, with cost to exceed $1,000,000.

BLACKBURN, ENGLAND—Blackburn Aeroplane & Motor Co. Ltd. plans extending its plant.

CANLEY, ENGLAND—Plans are being prepared for a new machine shop and other extensions here, at a cost of $500,000.

ENFIELD, ENGLAND — British Sangamo Co. is planning the construction of a plant for the manufacture of electric meters, time switches, etc., at a cost of $550,000.

WELLINGTON, NEW ZEALAND—Ford Motor Co. of Canada is to start construction of an assembly plant here, according to Wallace R. Campbell president. The project will cost $750,000 and will be ready by July 1, 1936.